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A Reply to Professor Brown's Criticism of my Views on Pluto

By WILLIAM H. PICKERING

In the *Monthly Notices* for 1931, **92**, 80, Professor Brown criticises my statements regarding Pluto, although without using my name. On page 84 he makes the surprising assertion, "From time to time statements have been published in astronomical journals and elsewhere that the maximum observable effect of one planet on another will take place at or close to conjunction. How completely erroneous such statements are can be shown either from the formula or from the curves in fig. 1." Now there are two quite distinct phenomena which occur when one planet approaches another, one is the maximum deviation, and the other is the maximum observable effect. I think that Professor Brown confuses the two. For maximum effect I have usually heretofore used the term maximum perturbation, but the words perturbation and deviation are rather too much alike, and maximum conspicuousness, although better, is rather awkward. In order to fix our ideas, let us imagine two large planets revolving about the Sun and that the orbit of the outer one is but little larger than that of the inner. When they pass one another the perturbing force or acceleration is much greater than when they are nearly on opposite sides of the Sun, but it has less time to act, so that the distance due to it, actually travelled, that is the maximum deviation, in some cases may well be less, as Professor Brown says, than when the Sun is between them. But now what is the maximum observable effect? As the inner planet approaches the other at a conjunction, it is rapidly drawn towards it at an increased speed, and owing to this speed, which is a maximum at conjunction, the distance or deviation increases for a few degrees, fifteen more or less, after the conjunction is passed, as is now well known. But the outer planet is now tending to draw the inner one backward, and at the angular distance separating them, about fifteen degrees, this retarding force is near its maximum efficiency. The result is a marked cusp, (a hairpin turn), the deviations which have been increasing very rapidly, suddenly stop, and decrease with even greater rapidity. On the other hand in the case of a perturbation that occurs near opposition, while the deviation produced may be larger, the duration is longer, and no *sudden change of speed* occurs, such as we have seen in the other case. Indeed such a prolonged perturbation if plotted as a curve hardly shows at all, and becomes absorbed into the therefore slightly erroneous orbit. As far as I am aware this distinction between maximum deviation and

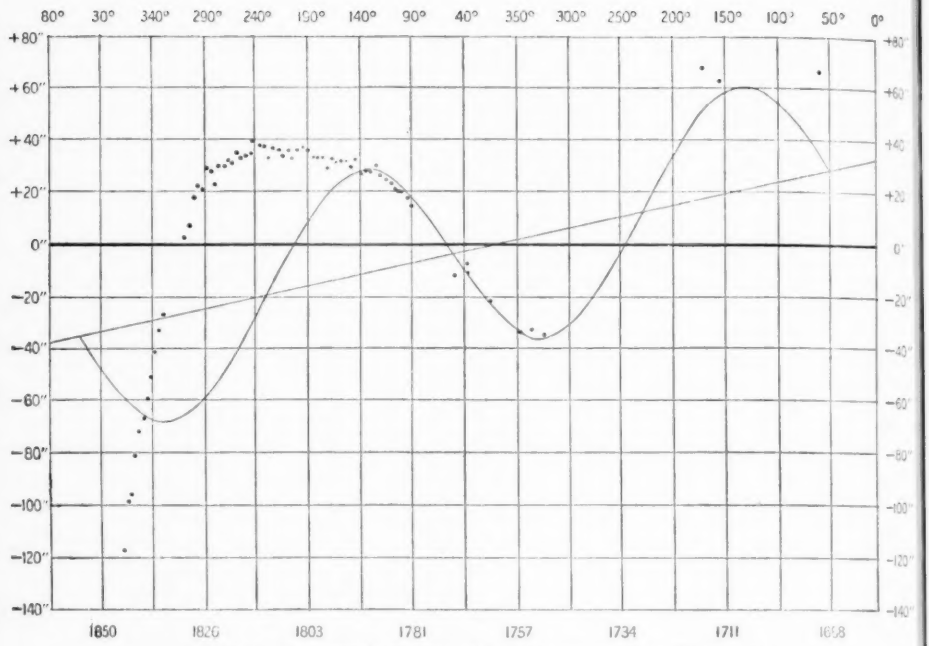


FIGURE 1. LEVERRIER'S ORBIT OF URANUS PERTURBED BY NEPTUNE.

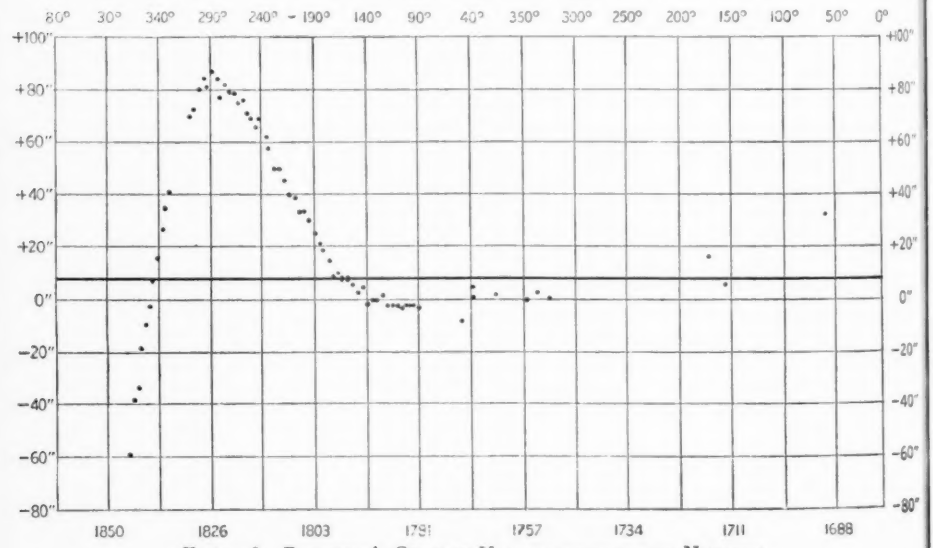


FIGURE 2. PICKERING'S ORBIT OF URANUS PERTURBED BY NEPTUNE.

maximum conspicuousness has never previously been made or published. Professor Brown's curve of deviations is perfectly symmetrical with regard to the longitude of conjunction. My curve of maximum conspicuousness is wholly unsymmetrical with regard to any longitudes.

We must now show that the effect at conjunction above described is sufficiently marked to be perceptible. The abscissas shown in Figures 1 to 4 are of angular distance, that is heliocentric longitude, and the ordinates of angular deviation in longitude from their expected values. The dates given at the bottom of each curve correspond approximately to the heliocentric longitudes. Figures 1 and 2 are taken from the *Harvard Annals*, 1909, **61**, 115, 116. Figures 3 and 4 are from POPULAR

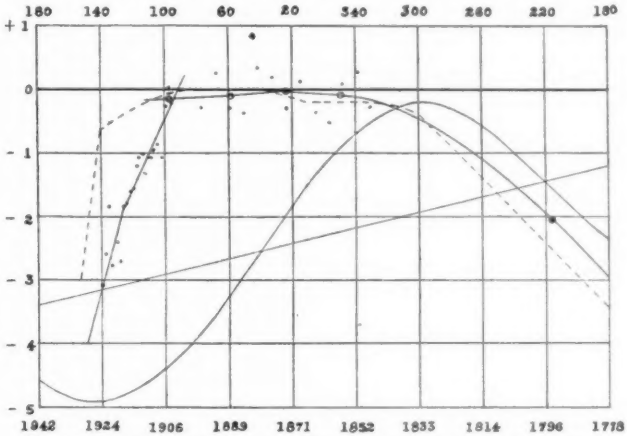


FIGURE 3. ACCEPTED ORBIT OF NEPTUNE PERTURBED BY PLANET *O*.

ASTRONOMY, 1928, **36**, 150, 151. I shall describe these figures rather briefly, referring those of my readers who may be interested in securing more detail to my original articles, of which the later one is, I believe, more clearly expressed. The ordinates of the small dots shown in Figure 1 represent the perturbations of Uranus due to Neptune from its accepted orbit, according to Leverrier's tables, which he constructed and used at that time. The last observation given is that of 1845, the year before Neptune was discovered. The heavy horizontal line indicates his adopted undisturbed course of Uranus. Although deviating on the average some 30″ from their adopted course, it will be seen that the observations lie in a fairly horizontal line from the date of the planet's discovery in 1781 to the year 1826. In that year, however, we see that a sharp break occurred in the line of observations which have now turned in a direction strongly inclined to the horizontal. That year is the date of the perturbation of maximum conspicuousness, or of maximum observable effect. Since that date is obvious and determined it is

not really necessary in order to predict the place of Neptune to make any change whatever in Leverrier's curve. It will however be desirable to do so for other reasons.

Since Adams' and Leverrier's computed orbits of Neptune were erroneous, it has always been somewhat of a mystery to everyone how it happened that they were able to predict so accurately the true position of Neptune in the sky. As Professor Brown says in his retiring Presidential Address, *Pub. Astr. Soc. Pacific*, 1932, **44**, 25, "It is evident that the values of the elements of the orbit could not be the controlling factor, since these elements could be greatly changed and still satisfy the observations quite closely." This is fairly conclusive. It is my impression that what Adams and Leverrier really did, whether they knew

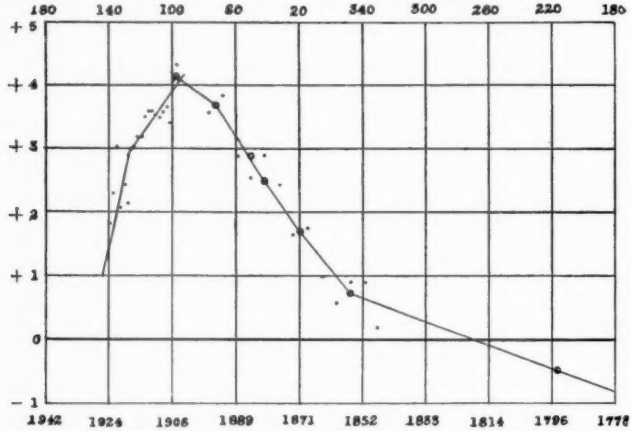


FIGURE 4. REVISED ORBIT OF NEPTUNE PERTURBED BY PLANET *O*.

it themselves or not, and the only thing in fact that they could do, was to locate Neptune by means of its perturbation of maximum conspicuousness,—exactly what I did for Pluto. During the next few years beginning with 1826, this perturbation made itself so marked, that it was widely discussed among astronomers, and Adams and Leverrier, who were then in their early twenties and thirties, were born at just the right time, to undertake the computation. The overtake period of these two planets is so long that the next following maximum will not occur until the year 1997.

Pluto was so remote from Uranus in 1860, the date when it should have produced its maximum perturbation of the latter planet, that no evidence whatever of the perturbation appears on Lowell's curve. In fact a level line passes through that date, and the two years preceding and following it. Without this perturbation he clearly had no chance to locate the planet. His error was 6°.

Let us now see what more can be done with Leverrier's orbit of

Uranus. It was early shown by Sir John Herschel that in any plot of observations, like that given in Figure 1, we may correct the period of the known planet Uranus, if we can so incline the origin of ordinates as to better fit the observations. This we are enabled to do by means of the three early records between 1690 and 1720. We thereby slightly lengthen the period which Leverrier had adopted. It is surprising that he did not see this himself. Probably he would have done so had he used a graphical method. Herschel also showed that by superposing on the inclined line a curve of sines whose period was exactly 360°, we can by changing its amplitude and node sometimes succeed in greatly reducing the apparent errors. These changes affect the eccentricity and longitude of the perihelion respectively, but since the ordinates are very small, the changes produced in the elements of the orbit are very slight. The sinusoid will then replace the inclined line as the origin of ordinates. One point to be noted in selecting it is that the maximum perturbation in 1826 must be the maximum ordinate of the final curve when we have later straightened out the sinusoid. (See Figure 2.) The process is analogous to that of determining the orbit of a double star graphically by means of a supplementary ellipse, the latter being replaced by the curve of sines. We now have the characteristic perturbation curve, Figure 2, of maximum conspicuousness or effect, with its sharply pointed summit, due to the proximity of the two planets when near conjunction. The conjunction occurred in 1822, just four years or 17° previous to the maximum perturbation or conspicuousness as shown in Figures 1 and 2, and all the dots in Figure 1, had Neptune not existed, should have coincided with Leverrier's heavy horizontal line. The striking deviations here shown from the planet's computed motion excited, as we have noted, a great deal of interest at the time, and for twenty years afterwards. This well-known historical fact does not appear to fit in well with Professor Brown's assertion quoted at the beginning of this article, which states that no conspicuous effect can be observed near conjunction. He then adds, "how completely erroneous such statements are can be shown either from the formula or from the curves." I trust he will forgive me if I suggest that his history like his mathematics needs some slight modification.

It will be understood that while my Figure 1 is Leverrier's interpretation of the observations of Uranus, made up to the year that Neptune was discovered, Figure 2 is my own interpretation of them, made by means of Sir John Herschel's suggestion, of a simple and rapid way of modifying the elements of an orbit. Countless other interpretations are of course also possible by means of Herschel's suggestion, the only question being to find the best one, that is the one which will give the smallest deviations from a plausible curve. The two planets were in opposition in 1736, but neither Figure 1 nor 2 shows any evidence of the large deviations near that date indicated by Professor Brown. Between 1711 and 1795 Uranus described a complete revolution in its

orbit, but since it did not pass near Neptune, only Professor Brown's perturbations, not mine, should show upon the curve of Figure 2. In point of fact we see that during this interval Uranus followed, as far as the observations show, a nearly level and unperturbed course. However, invisible perturbations due to Neptune really existed and, had we more observations more accurately made, they might perhaps have shown themselves. On account of their lack of contrasting movements, if we may so express ourselves, all of Professor Brown's perturbations have been absorbed into a slightly erroneous orbit of the planet, erroneous because, although far better than Leverrier's, yet, had Neptune not existed, the observed orbit would have been slightly different. Figure 2 is, however, obviously amply sufficient to show the large perturbation whose maximum was reached in 1826, four years after the conjunction of the two planets, and that was the object of the investigation. Figures 3 and 4 were constructed in the same manner for the perturbation of Neptune by Pluto as Figures 1 and 2, but Figure 4 was a little more difficult to construct than 2, because Neptune had been observed through only three-quarters of a revolution, including Lalande's observation of 1795. The characteristic perturbation curve of maximum effect with its pointed summit again appears. The conjunction in 1892 occurred ten years or 22° earlier than the maximum perturbation. The correcting angle, that between the longitude of the known planet at maximum perturbation and the longitude of the unknown body on the same date, was —11°.

I must now point out, if I am correct in my views as above stated, that to predict the longitude of an unknown planet by my method is now a comparatively simple thing. Whenever a known planet overtakes one that is unknown, or *vice versa,* there is a marked perturbation of the known one, whose maximum occurs from 10° to 25° later than the longitude of the unknown one upon that date. If, as usually happens, the curve is of the shape of Figure 1, the unknown planet is more remote from the Sun than the one which is known. On the other hand, if the later portion of the curve goes up instead of down, then the known planet is the more remote. If the two planets pass near one another, then the correcting angle may be only —10°. On the other hand, if we suspect that one planet is much more remote than the other, the correcting angle will be nearer —25°. For a very remote planet this angle is more uncertain than for a near one, but in any case it cannot be much larger than this latter figure. *It is not at all necessary to employ the sinusoid,* but by means of it one can compute the mass, and so get an idea of the brightness of the unknown body. Also one can compute the longitude correction a little more accurately.

The great difficulty with these outer planets is to compute their latitude. That question did not trouble Adams and Leverrier. They merely assumed that Neptune lay in or near the ecliptic, which proved to be correct. That was the difficulty in the case of Pluto that foiled the Mt.

Wilson astronomers. They did not find it upon their plates, taken for the purpose, until ten years later, after it had been found by Tombaugh, although it lay close to my predicted longitude. They failed to notice that I had said in my paper that the latitude of the planet had been south, but that it was moving northerly, and was now near the ecliptic. In point of fact it was a little over 3° to the south of it, which was pretty close considering that the inclination of the orbit is 17°. Their plates were capable of showing stars of the 17th magnitude. The magnitude of Pluto is 15.

On page 81 of Professor Brown's paper in the *Monthly Notices*, he states, "It is then shown that existing observations of Neptune are not sufficient to predict the existence of an exterior planet whatever the mass of Pluto may be, and that the early observations of both Uranus and Neptune cannot be satisfied." It appears to me that in Figure 4 the early observations of Neptune *are* satisfied. At least there is no deviation greater than 0."5. In Figure 2 by using my elements in place of Leverrier's I believe that the early observations of Uranus are *well satisfied,* especially considering the character of the instrumental equipment of the seventeenth and early eighteenth centuries. With regard to Professor Brown's statement that the existing observations of Neptune are not sufficient to predict the existence of an exterior planet, I believe it is now generally known among astronomers that my prediction of the longitude of Pluto was 69′ in error, Leverrier's prediction of the longitude of Neptune was in error by 52′, and that of Adams by 2° 27′.

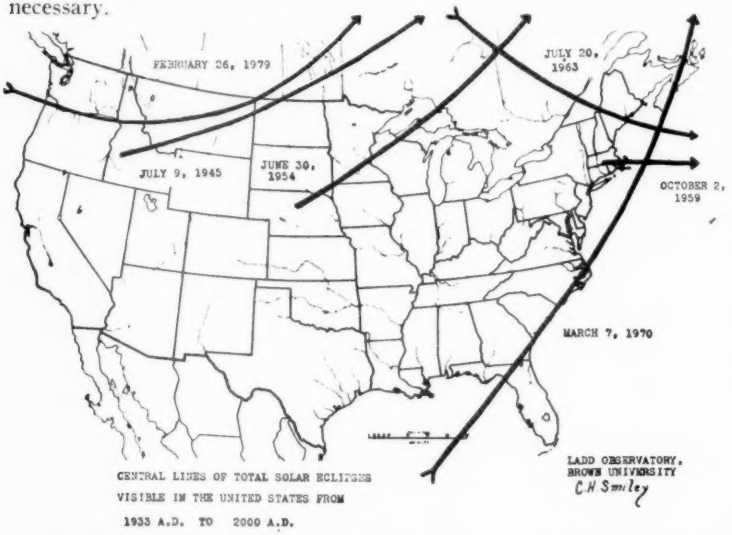
It will be seen that Professor Brown and I have attacked our problem from opposite directions, and it is very regrettable that his statements based on his theory do not seem to coincide with the facts, but if he will put a little more work into it along the lines I have suggested, I have no doubt but that he can make them do so. It was Airy I believe who once remarked that whenever mathematics could be brought to coincide with facts he was always greatly pleased.

Private Observatory, Mandeville, Jamaica, B. W. I., April 7, 1932.

Total Solar Eclipses in the United States between the Years 1933 and 2000

By CHARLES H. SMILEY

There will be six more total solar eclipses visible in the United States before 2000 A.D. They will occur on July 9, 1945, June 30, 1954, October 2, 1959, July 20, 1963, March 7, 1970, and February 26, 1979. Of these, the first three will occur at or near sunrise within the boundaries of the United States and consequently they will not be available for the study of many of the problems now commonly studied at total solar eclipses. However, one cannot say how many new problems will be found for which sunrise eclipses will be satisfactory and perhaps even necessary.


FEBRUARY 26, 1979
JULY 20, 1963
JULY 9, 1945
JUNE 30, 1954
OCTOBER 2, 1959
MARCH 7, 1970
LADD OBSERVATORY, BROWN UNIVERSITY
C.H. Smiley
CENTRAL LINES OF TOTAL SOLAR ECLIPSES VISIBLE IN THE UNITED STATES FROM 1933 A.D. TO 2000 A.D.

The figure shows the central lines of these six eclipses. It should be mentioned that the central lines as shown were drawn through numerous points whose positions were computed using the elements given in Oppolzer's "Canon der Finsternisse." Hence they may be expected to be somewhat more accurate than those given in Oppolzer's valuable reference work since the latter are just circles drawn through three computed points of the path.

It may be noted that for points in Maine, totality in the 1963 eclipse will begin about 5:40 P.M., Daylight Saving Time, and will last about seventy seconds. The sun will then be about twenty-seven degrees above the horizon.

Of particular interest is the fact that the path of the 1970 eclipse will cross northern Florida and continue up the Atlantic coast for more than 500 miles. For a point in southern Georgia totality will last about two hundred seconds. The sun will be high in the sky since the eclipse takes place shortly after the sun crosses the meridian.

For a point in northeastern Montana, totality in the 1979 eclipse will occur about 2:40 P.M., Standard Time, and will last about one hundred sixty seconds. As has already been pointed out by Dr. S. A. Mitchell, Montana and Idaho are likely to be very cold and stormy in February, and the 1979 eclipse cannot therefore be called one of the most promising.

Although thirty-one years will pass before another scientifically satisfactory total eclipse of the sun will be visible in the United States, our astronomers will not be content to wait so long. Already some of them are looking forward to the splendid eclipse of June 8, 1937, and considering ways and means of taking eclipse expeditions to one of the small islands in the Pacific, perhaps the elusive Sarah Anne Island.

Asteroids 1932 EA_1 (Delporte) and 1932 HA (Reinmuth)

By G. VAN BIESBROECK

The number of known asteroids is increasing steadily from year to year. As many as 1200 have been sufficiently observed for insuring reliable predictions of their future course and have therefore received a definitive number. For many hundreds more the observing material is not suitable for a computation and their future recovery remains a matter of chance. Among this great number of objects some are of special interest, and repay the large amount of work devoted to this class of celestial bodies. The name of Eros evokes at once the elaborate investigations that this tiny planet has suscitated. Its peculiar orbit brings it at times so close to the earth that it then affords one of the best opportunities accurately to measure the distance between sun and earth.

Last spring two more asteroids interesting from this point of view have been found in the course of the regular photographic search. The first one was found March 13 by E. Delporte at the Royal Observatory of Belgium and was designated as 1932 EA_1. On a plate taken the night before appeared a trail of unusual length made by an object which the discoverer estimated to be of magnitude 10:

1932 March 13.02730 U.T. $12^h\ 2^m\ 37^s.89$ $+3°\ 39'\ 26''.8$.
Daily motion $+6^m\ 8^s$ and $+88'$.

This apparent motion is nearly ten times as large as the average daily shift of asteroids and in the opposite direction so that there was at first

some doubt about the true nature of the object. Such a motion is not uncommon among comets but it was most unusual for an asteroid. The object was at once followed at various observatories. The absence of a coma and the stellar character of the image were noticed by several observers. This indicated that the object was not of a cometary nature but that it was an asteroid that happened to come exceptionally close to the earth. During the first days it was not easy to keep track of such a rapidly moving object, and, to make matters worse, it soon lost in brightness. Happily, enough measures were obtained for computing preliminary elements and thus predicting the position. At first parabolic orbits were tried and some resemblance with the orbit of the comets 1858 III and 1907 III was noticed. But further discussion showed that the orbit was an eccentric ellipse corresponding to a period of 2.76 years. From an arc covering nearly a month (March 13 to April 10) H. Kahrstedt deduced the following orbit which represents a close approximation to the final value:

Perihelion	T = 1932 April 4.75422 U.T.	
Longitude of Perihelion	ω = 25° 15′ 25″.6	1932.0
Node	Ω = 171 9 0.6	1932.0
Inclination	i = 12 10 48.3	1932.0
Eccentricity	ϕ = 26 38 23.7	(e = 0.44838)
Semi-major Axis	a = 1.97118	
Mean Daily Motion	μ = 1282″.093	

The orbit is illustrated in the diagram, which shows its relation to the paths of the planets, Earth and Mars. The plane of the motion is inclined by 12° on that of the earth's orbit but in the drawing this has been disregarded. The high eccentricity combined with the short period brought the asteroid to within 10 million miles of the earth (March 23). This is much closer than Eros ever can come, however the object is much fainter than the latter and therefore hardly suitable for determinations of solar parallax. During the months of April and May Delporte's asteroid gradually receded from the earth; it had dropped to 17^M in the beginning of June when it was last recorded at the Yerkes Observatory. A final discussion of all the observational material is under way at the Rechen-Institut in Berlin; the arc covered seems long enough for a safe prediction of the next return in 1935. According to a recent announcement this planet has received the name of Amor.

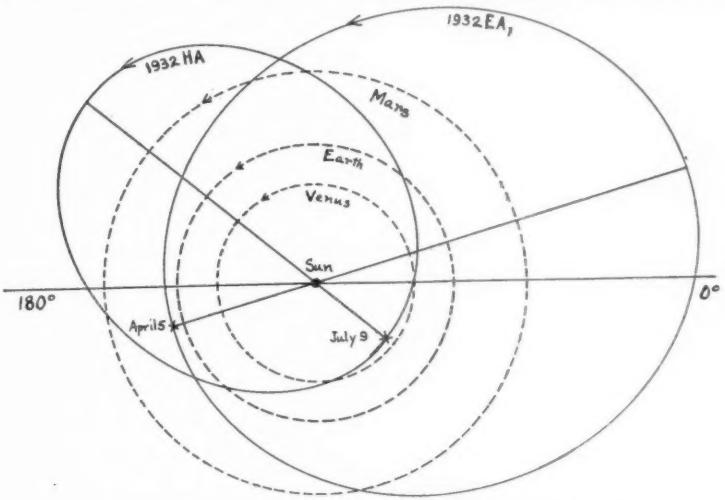
Before Delporte's asteroid was out of reach another, still more exceptional, object of this class was discovered. This time the discoverer was K. Reinmuth at Heidelberg, Germany, who found the asteroid on a plate exposed April 24:

1932 April 24.89056 $13^h\ 56^m\ 52^s.43$ $-10°\ 32'\ 38''.5$

Daily motion: $4^m\ 56^s$ and $-4'$.

It was designated as 1932 HA. It was quite faint, being estimated as equivalent to a 12^M star on April 27.

At the Harvard Observatory the object was picked up on April 29 and 30 by Whipple and Cunningham who computed a first orbit showing that the object was nearing the earth considerably. On May 3 the writer examined it in the 40-inch refractor under fairly good conditions and noticed the stellar appearance of the object, the diameter of which was less than 0″.3 at that time. The following days the apparent motion increased so much that it was difficult to keep track of this run-away object. On May 14 the daily motion reached 27 minutes in right ascension and one degree in declination, a figure that no other known asteroid ever reached. This was due to the great proximity to the earth, the



Orbits of the three Planets, Venus, Earth, and Mars, with Asteroids 1932 EA_1 and 1932 H.A.

minimum separation being then about 6.7 million miles according to the following elements which the Berkeley computers, Wyse and Miss Cover, deduced from the measures on April 27, May 6, and May 14:

Perihelion Passage	= July 7.680 U.T.	
Perihelion to Node	= 284° 50′ 29″	1932.0
Longitude of Node	= 35 50 47	
Inclination	= 6 22 26	
Eccentricity	= 0.56290	
Period	= 1.7975 years	
Semi-major Axis	= 1.47834 astr. units	

The same diagram used for 1932 EA_1 illustrates also the position of this exceptional orbit: the period is shorter than that of any known asteroid, only half that of Encke's periodic comet which has the shortest known orbital motion around the sun. The greater part of the orbit is within that of Mars. The eccentricity is so large that at perihelion the

asteroid is not only within the orbit of the earth but well within the orbit of Venus! The inclination is small so that at times the object may appear projected on the sun, but the body is so tiny—probably only very few miles in diameter—that it is questionable if it would be visible at that moment. The Reinmuth object was last photographed at the Lick Observatory on May 14, at the Yerkes Observatory on May 15 but was lost into daylight after this date. The arc thus sparsely covered with observations does not extend over more than three weeks. This means that there remains some uncertainty in the elements and that it will be difficult to recover this asteroid in the future. Last August its computed position made it observable in the morning sky, but several observers failed to recover it. If it could be found in the future it might offer an unexpected opportunity to improve the determination of the mass of Venus.

The Harvard Eclipse Expedition of 1932

By F. L. WHIPPLE and L. B. ANDREWS

It was certainly two-thirds chance and one-third meteorological consideration that the Harvard Eclipse Expedition to Gray, Maine, to observe the eclipse of the sun on August 31 had a beautifully clear sky all that afternoon. In the search for a high probability of clear sky the Harvard group selected a site twenty-two miles east of the central line. It was tacitly assumed among eclipse enthusiasts that cumuli were the greatest risk that the observers would face in their search for successful observations. The Department of Meteorology at Harvard approved the suggestion that, since cumuli form on ascending currents of air, a large lake with its down-draught, if the day should be warm enough to make the water temperature lower than the land temperature, would have the effect of dissipating cumuli as they drifted out over the lake.

There were two large lakes in the track of totality, Lake Sebago and Lake Winnepesaukee. The latter was discarded due to its proximity to the mountains and a reputation of prevalent cloudiness. The former was, therefore, selected and inasmuch as prevailing winds in its vicinity are from the southwest to the northeast, the town of Gray, five miles east of the lake, was taken as being well protected by the lake from the threatening clouds.

Mr. A. J. Small, the owner of the farm upon which the expedition located, was a little reserved when asked if he could verify from experience our meteorology, but he did say that he had seen thunder squalls, approaching the lake from the west, break into two parts, one part circling the lake to the south, the other part circling it to the north. He thought this might possibly be corroborative evidence.

The Harvard Expedition occupied its camp site a total of seven days and on six of these days it saw its meteorology work perfectly. An

alibi can be found to explain the exception. On eclipse day the lake kept the cumuli and rain to the west of itself as was readily apparent from Gray. Over Gray thin cirrus were present until noon, when, under the influence of a northerly breeze, they passed down to the southward leaving a perfectly clear sky.

For the eclipse camp the computed duration of totality was eighty-seven seconds, not so greatly less than the longest possible duration of ninety-nine seconds in this vicinity. Actually the duration as measured from the disappearance of the last bead to the reappearance of the first bead was somewhat shorter since the beads were a prolonged phenomenon, very beautiful visually, but slightly bothersome photographically. Actual totality covered about eighty seconds.

The personnel of the expedition included Dr. Annie J. Cannon, who was observing her fifth eclipse, Mr. L. S. Barnes and Mr. W. A. Calder, graduate students in Astronomy, Mrs. Calder, Mr. Raymond Boyd, a volunteer assistant, and the authors. In addition a party under the leadership of Dr. Willi Cohn, commercial research assistant, and consisting of Mrs. Cohn, Mr. and Mrs. R. N. Mayall, and Mr. R. E. Leary, coöperated in the program of the camp. Mr. Thornwald Jacobs counted seconds.

The program in the main was concerned with measuring the relative proportions of scattering and polarization in the corona. Direct photography was undertaken in the ultra-violet, violet, blue, green, red, and infra-red using appropriate filters. Mr. Barnes utilized a reflector of seven and a half inches aperture, the new Eastman infra-red plates, and a red filter to obtain an infra-red photograph. Mr. L. B. Andrews used two telescopes, one with a photographic objective of 5½ inches aperture and 68 inches focal length for the blue and violet photographs, the other with a visual objective of 4½ inches aperture and 58 inches focal length for the red and green photographs. Dr. A. Kopff of the Rechen-Institut, Berlin, operated the lens caps of these two cameras during the exposures, making exposures of three seconds and twenty seconds through each filter. Mr. J. L. Greenstein operated the blue-violet camera. Dr. F. L. Whipple used a quartz lens of three inches aperture working at f 1.8, coated with six layers of silver, to obtain the ultra-violet registration. The success of this photograph is indicative of the clarity of the atmosphere. The Cohn party operated three telescopes, two visual and one photographic for polariscopic observations. The photographic records show admirably the changing polarization of the coronal light in different position angles and at different distances from the sun's limb.

To obtain reduction curves for the photometric measures of the plates, pieces of the plates utilized for the eclipse photographs were exposed to the sun just before the beginning of the eclipse in a spectroscope with a five step slit, the slit widths varying approximately in the proportions 1-2-4-8-16. Thus five intensity steps are obtained in each wave-length.

In addition a series of standard intensity squares was impressed on other pieces of the plates using the integrated light of an Argand Lamp.

In addition the total brightness and the color of the corona were measured in two ways. Dr. Cannon used a King pin-hole photometer of the type used at many earlier eclipses to register the color of the corona. Other photometers were operated by Miss Margaret Harwood at N. Truro on Cape Cod, Mr. Leon Campbell at Sanford, Maine, and by Dr. H. T. Stetson at Douglas Hill, Maine. Cloudy weather prevailed at Douglas Hill, but it was clear at the other stations. Mr. and Mrs. W. A. Calder operated a new photo-electric photometer to measure the total brightness and color of the corona.

An attempt was made to observe the time of first contact by the cusp-chord method. Mr. Barnes, using his reflector, obtained a series of plates during partial eclipse before totality. Father Rodés, a visitor to the camp, also observed the time of first contact by observing the image of the sun projected onto a screen by a visual telescope. The agreement of the observed and the computed times must await the computation of the exact position of the camp.

If the Harvard Expedition had accomplished nothing else, it would have established the fact that two and a half days is the minimum possible time in which to install the equipment to be used for observation at a medium-sized eclipse camp.

The Adler Planetarium and Astronomical Museum of Chicago

By PHILIP FOX, *Director*

THE ASTRONOMICAL MUSEUM.

[*Continued from page 351*]

Hour-Glasses and Clocks. Instruments which determine or mark the time by the position of the heavenly bodies are dependent on clear skies. Clouds may have been the spur to the invention of the clepsydra, sand-glass, and clocks. The hour-glass or sand-glass and the clepsydra or water-clock are probably coeval. If so, the hour-glass has a life history of well over 2000 years. Its invention is, however, often attributed to Luitprand of Chartres, a monk who lived in the eighth century. The hour-glass has certain advantages over the water-clock; sand does not freeze or evaporate, enclosed it may be kept dry and runs at a regular rate, a new supply is never needed.

The Museum possesses twenty-four hour-glasses, a few of which may be seen in Fig. 29. Some of them bear master-marks: Stag, Posthorn, Lion, Comet, Imperial Orb. The mark of the Orb was used by Hans Ducher (Tucher) (1572?-1632?), see A.M. 173 (Fig. 34), but the hour-

glass which bears this mark has the initials "H. M." and the date "1744." The quadruple glass to the left on the upper shelf has very white sand or perhaps finely ground eggshell.

The first mechanical clocks appeared in the thirteenth century, in Westminster 1288, Canterbury 1292, Caen 1314. The Tour de l'Horloge in the Palais de Justice in Paris was built in 1298 and shortly thereafter a clock was installed. De Vick's clock was erected there in 1364 or

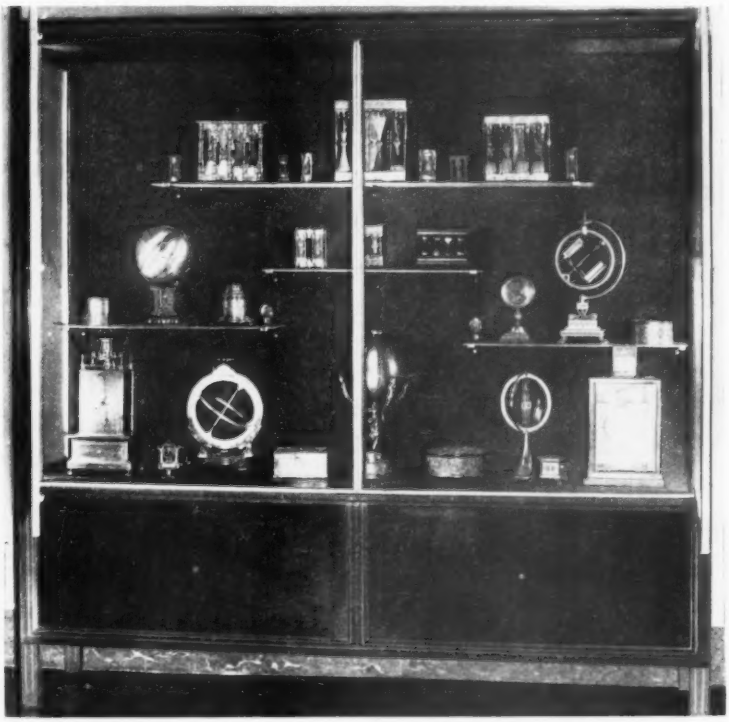


FIG. 29. A CABINET FOR HOUR-GLASSES, CLOCKS, AND DIALS.

thereabouts. None of these early clocks made great pretense of keeping accurate time. They were frequently checked by sun-dials. The essentials of a clock are: 1, a device to give equal intervals of time, (pendulum or balance wheel); 2, a device to keep the first in operation and release periodically the clock train, (the escapement); 3, a recording dial. The first requisite was available after Galileo in 1583 discovered the isochronism of the pendulum but was not successfully adapted until 1657 when Huyghens presented his clock to the States General of Hol-

land. Modern clock-making may date from that event. Collections of clocks and watches are frequently seen and furnish characteristic and valuable exhibits of the instrument maker's technique as well as the development of the time-piece itself. The French attained an early ascendency in clock-making probably due to Huyghens' residence in Paris (1666-1681). In the observatory of Leiden there is a clock signed "Thuret à Paris" constructed "suivant les indications de Huygens et lui appartenait" . . . "Thuret . . . a beaucoup travaillé pour Huygens et on rencontre son nom un grand nombre de fois dans la correspondance." [12] The revocation of the Edict of Nantes (1685) drove the clock makers, who were mostly Protestants, from France to London, Geneva, etc. France never regained her dominant position in this art.

Of the twenty clocks of the collection six are signed:

A.M. 378 "Cas. Bv."—Caspar Bushmann of Augsburg, (c. 1580).

A.M. 379 "V S / W" —The initials V.S. were used by Ulricus Schniep (-d. 1588) by Victor Stark (c. 1600) and by Virgil Solis (c. 1550).

A.M. 383 "Johann Christoff Lang Inn Augspurg" (c. 1600).

A.M. 388 "J. B. Letter A Zug" (Switzerland 18th century).

A.M. 390 "Jean van Ceulen le Jeune Hague" probably the son of Van Ceulen the horologist who made Huyghens' planetarium in 1682.

A.M. 393 A so-called "Nürnberg Egg" by "Jacob Pouillet Clermont." Bears the arms "de la Tour d'Auvergne" and the device "Plutost Mort, Que Vaincu."

Another similar "Egg," A.M. 394, in the style of Salomon Chesnon of Blois, for insurance is provided with a small sun dial. The works are missing, whether by accident or disgust of the owner over the inferior performance when compared with the dial is conjectural.

A.M. 377 (Fig. 30) is a very handsome piece, diameter 235 mm. The top bears an astrolabe design for the solar calendar, with engraved indices for the Sun and Moon. The case of gilt or ormolu, "feuervergoldet," is engraved in high relief with Orpheus and the charmed animals, stag, boar, cock, rabbit, wolf, bear, lion, birds. On the bottom is figured a perpetual calendar and centrally, Adam and Eve and the Serpent under the tree of the forbidden fruit. Engelmann notes that the clock is in the style of Virgil Solis (c. 1550) and Jost Amman (c. 1568). But Milham in "Time and Timekeepers" shows a quite similar piece from the British Museum "probably by Jeremias Metzger of Augsburg, and dates from about 1530." [13] This piece Mensing ob-

[12] Christian Huygens, H. J. Paris, Amsterdam 1929, p. 53.

[13] Willis I. Milham, Time and Timekeepers, New York, 1929, Fig. 77, opposite p. 125.

tained from A. S. Drey who in turn had purchased it from a Russian collection.

The clock in Fig. 31 is in the Museum on loan from Mr. A. S. Drey of New York and Munich. It should perhaps have been noted also under Celestial Globes. This rare globe-clock stands 470 mm high, the globe has a diameter of 290 mm. Its great interest aside from its artistic merit lies in the name of the maker *"Isaac Habrecht."* He is of that family of Strasbourg horologists of whom Ungerer writes in "Les Habrecht, une dynastie d'horlogers Strasbourgeois au XVI[e] et XVII[e] siecle." [14]

Fig. 30. A.M. 377. A Round Table Clock of About 1550.

Isaac Habrecht (1544-1620) is known as the constructor of the most famous clock in the world, the great astronomical clock of the Cathedral at Strasbourg, a task finished in 1574. (It should be noted that the present Strasbourg clock is a reconstruction by Jean Baptiste Schwilgue done in 1838-42.) This Isaac Habrecht could not have made the clock exhibited here for it bears the date 1646. Neither could his son Isaac II, a physician, mathematician, astronomer, have made it for his death occurred in 1633, but its author was his grandson Isaac III (1611-1686) "Horloger a Strasbourg."

The Museum has a small Japanese clock, a gift of Mr. William B.

[14] Theodore Ungerer, Edition des Archives Alsaciennes d'Histoire de l'Art, Strasbourg, 1925.

FIG. 31. GLOBE CLOCK BY ISAAC HABRECHT, STRASBOURG, 1646.
LOANED BY A. S. DREY OF NEW YORK AND MUNICH.

Parmelee of Chicago; from Mr. Adler a tall clock of Chinese construction with a regulator of Foliot type; of modern time-pieces, a chronometer, T. C. Negus and Co. No. 562, from the U. S. Navy, and a small electrical clock from the Hammond Clock Co.

Just as ancient Time-keepers sufficed to show the inequality of apparent solar days and led eventually to the adoption of Mean Solar Time, so modern astronomical clocks in their present refinements (in the Shortt Free Pendulum Clock of the Synchronome Company of London, for example) may indicate inequality of period in the rotation of the Earth itself.

Calendars. In the century before the promulgation of the Gregorian Calendar, 1582, there was so much agitation for calendar reform that many clever, able mathematicians gave their attention to the problem. The results of their labors were wrought into the form of various ephemerides and perpetual calendars. The confusion which followed the announcement of the New Calendar served as added impulse for their design.

There are fourteen instruments in the collection classified primarily as Calendars. On many additional instruments analogous devices are noted and on the other hand, several of the fourteen have added features. They bear distinguished names for authorship:

A.M. 363 "V. C."
A.M. 364 "Christofforus Schisler"
A.M. 365 "Christophorus Schissler"
A.M. 366 "Io. Bonius"
A.M. 367 "Barent Hendricke"
A.M. 368 "Erasmus Habermehl"
A.M. 369 "Schindler"
A.M. 375 "Sevin"
A.M. 477 "Johannes Melchior Volkmair"

All are of deep interest but two are selected as representative of the finest design and craftsmanship.

A.M. 363 (Fig. 32) is one of the finest pieces of the entire Collection. It has an elaborate calendar, extensive ephemeris for 1556-1585, a sundial, nocturnal, quadrant, compass, a map of the world, called "VNIVERSAL COSMOGRAPHIE,"— a veritable compendium of knowledge. All parts fold like a book into a compact pack, 69x69 mm, held by small clasps with angel heads engraved on them. The inscriptions are in Latin and English: "Tabula + medii + motus + solis." "A TABLE FOR THE HOVRES OF Planets . . ," "A TABIL OF QVANTATIE OF DAIS," "for the mone bi niet," "AEQVINOCIALI ELEVATIO" are given only for English cities, DOVIR, LONDON, LYNKON, YORKE, NEWCASTEL, BERWYKE, EDYNBORRO, EXONIA, CANTOR, COLCEST, HERTFORD, LEICESTER, NOTISHAM, CESTRIA (Chester). It is signed "V. C. 1557."

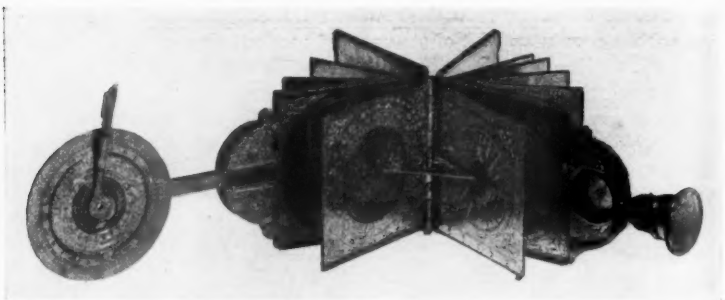


FIG. 32. A.M. 363. A CALENDAR, EPHEMERIS, SUN-DIAL, NOCTURNAL, QUADRANT. OF ENGLISH MAKE BY "V. C. 1557."

The whole is of fine gilt, handsomely engraved; a coat-of-arms in the handle, to be used as a seal; an armed figure facing a giant, perhaps David and Goliath; an armillary sphere on the pediment. This is an exceedingly interesting piece: of it Engelmann writes "Sehr beachtliches Erzeugnis eines bedeutenden Instrumentenmachers oder Goldschmiedes, der wohl unter Aufsicht eines hervorragenden Gelehrten seiner Zeit arbeitete." In many respects similar to the "V. C." pocket dial and calendar at the Ashmolean Museum.[15] Gunther suggests that "V. C." stands for VMFREDVS COLE perhaps the father of Humfray Coole. (Humphrey Cole.) The coat-of-arms is parted with lozenges dexter and a lion sinister. The lozenges may be for Sir William Fitzwilliam (1526-1599) Lord Deputy of Ireland. The lion is

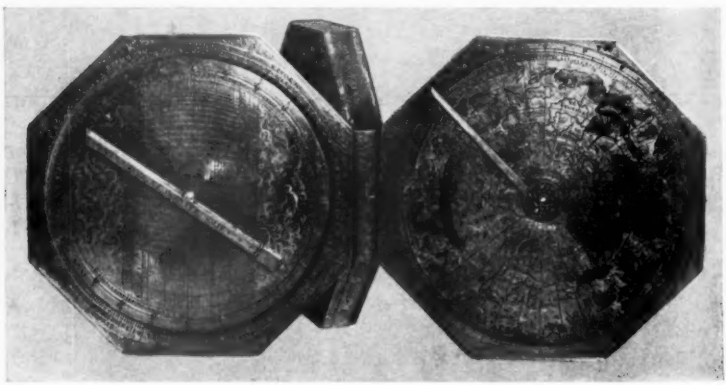


FIG. 33. A.M. 365. A CALENDAR, SUN-DIAL, WORLD MAP BY CHRISTOPHORUS SCHISSLER, 1559.

[15] Gunther, Early Science at Oxford, II, Oxford, 1922, p. 279.

too common to be easily assignable. The wife of Sir William was Agnes, daughter of Sir William Sidney.

A.M. 365 (Fig. 33) is another important piece as unmistakably German as A.M. 363 is English. But this piece is signed, and by the foremost German instrument maker of his day "CHRISTOPHORVS SCHISSLER ME FECIT AVGVSTE VINDELICORVM" (Augsburg). There are four signed pieces in the collection by this master and five others that are probably of his authorship. The piece bears an interesting polar projection map of the Earth to the Tropic of Capricorn, the seas in silver, the land in brass-gilt. The land forms are crude, North America, called "BACCALEARVM" no larger than "CVBA." Drake had not yet made his great voyage. The sea, however, floats great ships, also fearsome monsters, and two-tailed mermaids, melusines. On the inner surface there is an engraved map of Germany but taking in Leiden, Ghendt, Remis, Lecern, Innsbruck, Cracow. It bears a horizontal sun dial with scales for seven latitudes 39° to 57°. Latitudes of many European cities are given. It has a central compass, a calendar with device for lunar phases and configurations, a nocturnal. About the periphery the date "ANNO 1559" and the inscription "SIVE MARE ET TERRAS SEV COELVM ET TEMPORA QVAERVIS ME DVCE PERPETVO CERTIOR ESSE POTES" which may be rendered "Whether you are searching out the sea and the lands or the sky and the seasons with me as your constant guide you can go more safely" or "Whether you seek sea and land or sky and the seasons you will ever be able to be well assured with me as your guide."

From the Hamilton-Sangamo Corporation the Museum has received a small moulded paper replica of the great Aztec Calendar Stone of the National Museum of Mexico, an instrument of extraordinary interest.

Compasses and Natural Magnets. One turns naturally from the legend on the Schissler calendar to a consideration of compasses. So many instruments of the Collection—sun-dials, circumferenters, etc., bear compasses that it is quite impossible to make a clear-cut classification. A.M. 173 (Fig. 34) is a compass signed "hanns ducher (sometimes written Tucher) faci eh badt 1609" (1572?-1632?). It bears also his "meistermarke" the imperial orb (reichsapfel). (Another mastermark used by a Hans Tucher of this family is a crowned serpent.) It is a fair example of the work of this master who was a distinguished member of a family of instrument makers. Note that the numeral 4 retains its Gothic form. The spandrels have characteristic engravings.

The origin of the compass certainly rests on the discovery of the curious properties of the lodestone. There are two of these natural magnets in the cabinets, A.M. 414 and 415, both of which preserve their potency. The first is shown in Fig. 35 in front and back views, picturing a ship home from its farings, sails furled, safe in the harbor. English equivalents of the inscriptions on the face are: "With this guide he

will find the harbor," "Amalfi first gave to us the use of the magnet," words perhaps quoted from the Italian poet Antonio Beccadelli (1394-1471) sometimes called "Panormita" from his birthplace Panormus (Palermo), who has the commemorative line "Prima dedit *nautis* usum Magnetis Amalphis." The longer legend on the back may be rendered: "The magnet a prodigy of nature, a wonder worker of marvels, an inscrutable labyrinth of hidden virtue. This alone guides navigations and

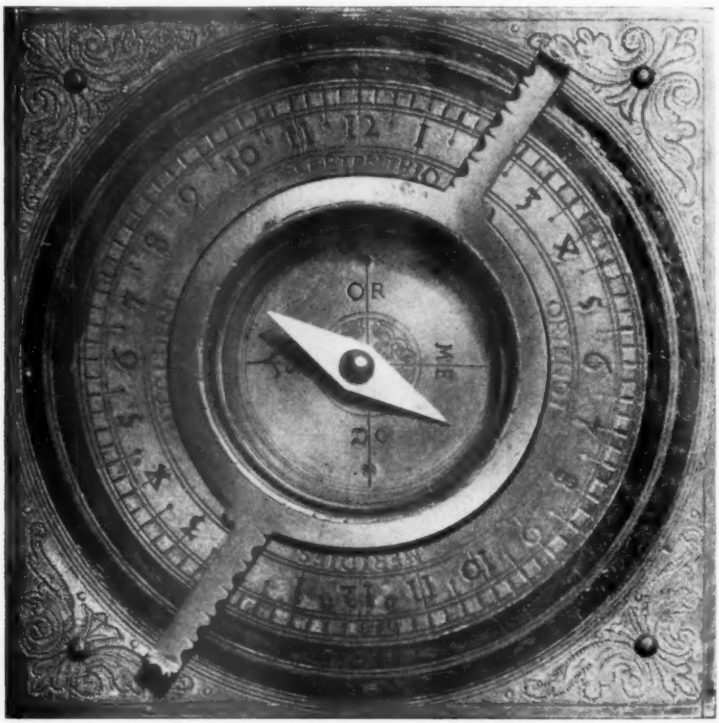


Fig. 34. A.M. 173. A Compass by Hanns Ducher, 1609.

to their desired harbors leads sailors on the unknown paths of the uncharted sea."

Makers of ancient instruments wrought with deep sincerity and often with pious devotion. Perhaps in our great factories we have lost something of this pride and devotion. In our day it seems a little naïve that a great pair of rough, wrought-iron calipers or dividers for use about a forge should be engraved "Joseph Maria Jesus," as are A.M. 80 and 85. Religious legends are found on many of the early sun-dials. This

practice is nowhere better illustrated than by the inscription on the natural magnet A.M. 415: "Gleich wie der Magnetstein Das Eisen an sich Ziehet, Also Ziehet Christus Jesus die Seelen der Glaubigen auch an sich."

In contrast to the ancient instruments the Museum has a binnacle and compass which crossed the Atlantic on the replica of the Santa Maria when Spain dispatched the duplicated caravels of Columbus to the Columbian Exposition in Chicago in 1893. Gift of the South Park Commissioners. Also it has a modern gyrocompass and repeater from the U. S. Navy.

FIG. 35. A.M. 414. A NATURAL MAGNET ENCASED IN SILVER.

Geodetic Instruments. Many of the instruments of geodesy are utilized also in astronomy: the quadrant, graphometer, circumferenter, torquetum, theodolite, etc. A cabinet containing a few of these instruments and some telescopes as well is shown in Fig. 36.

The graphometer, a graduated half-circle with diopters, a glorified protractor with alidades for sighting, was invented in the second half of the sixteenth century. It was first described by Philippe Danfrie in 1597. Its functions are amply set out in his title page, "Declaration de l'usage du graphomètre par la pratique duquel on peut mesurer toutes les distances des choses de remarque qui pourront voir et discerner du lieu où il sera pose: et pour arpenter terres, bois, prés et faire plans de villes et forteresses, cartes géographique et généralement toutes mesures visibles; et ce, sans reigle d'arithmétique." [16] To avoid arithmetic its readings are transferred to a plane table (planchette) with the aid of a protractor (rapporteur).

The collection contains graphometers signed by "Capitan Petru Spera Deo," A.M. 145; "Pierre Sevin a Paris" (instrument maker for Cassini), A.M. 147; "Lasnier a Paris aux Deux Globes," A.M. 148; "J. Maretz f. Aix," A.M. 157. The Sevin instrument, A.M. 147, of about

[16] Laussedat. Recherches sur les Instruments les Méthodes et le Dessin Topographiques, T. I., Paris, 1898, p. 76-77.

1670 and a protractor, A.M. 94, are reproduced in Fig. 37. The graphometer is provided with a diagonal scale reading to 0°.1. A similar figure is found in the volume by Laussedat (his Fig. 22, p. 75). The protractor, practically identical with that in Laussedat, is unsigned unless the "S R" are initials. They may stand for Sevin A Paris, the letter which appears as an R may be a monogram AP.

The circumferenter or full-circle diopter instrument, in France called

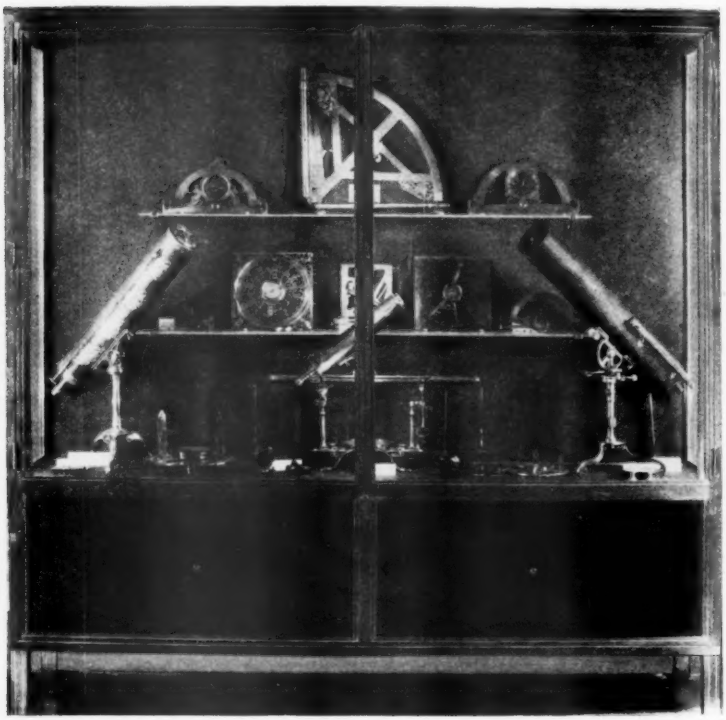


Fig. 36. A Cabinet of Geodetic Instruments and Telescopes.

the "Cercle Hollandais," is sometimes attributed to Jan Pieterszoon Dou of Leiden about 1610. It is described by him in a volume first published in 1612. The Conservatoire National des Arts et Métiers has a circumferenter by Coignet dated 1606. In the Chicago museum also there is one, A.M. 149, inscribed: "Elaborat Antuerpie Michael Coignetus CIↃ IↃ CVI" (1606). This is now on loan to the Museum of Science in Buffalo. Besides this there are signed ones by "D'Amery Matemat. A Bruxelles" (A.M. 150, c. 1630), "Oller Fecit Amstel"

(A.M. 154, c. 1660), "J. Bennett London" (A.M. 156, c. 1750).

A.M. 153 (Fig. 38) is unsigned but is like in style in all particulars—compass, alidades, wind directions on the eight shields (rosa dei venti), general filigree ornament within the circle and in the spandrels—to the work of Vagnarelli, a master of Urbino of the seventeenth century.[17] It has neither diagonal scale nor vernier though it is subsequent to these two inventions. A further development of this instrument is shown in

A.M. 94
A.M. 147

FIG. 37. A GRAPHOMETER BY PIERRE SEVIN OF PARIS AND A PROTRACTOR PROBABLY OF THE SAME AUTHORSHIP.

A.M. 156 (Fig. 39) signed "J. Bennett London." It has a vernier to read to 5'. (This may be the Bennett of Cork of the end of the eighteenth century.)

[17] Rohde, Die Geschichte der Wissenschaftlichen Instrumente, Leipzig, 1923. Abb. 93, p. 69.

With the obvious advantages of the circumferenter, it is curious that it did not immediately displace the graphometer. It seems rather that both of them were finally displaced by the Torquetum and Theodolite. These instruments by virtue of the two circles perpendicular to each other, whether placed as an alt-azimuth or equatorially, enable the two coördinates to be read with one pointing. The statement is found that the torquetum was invented by Naer ed din about 1260. Regiomontanus

FIG. 38. A.M. 153. A CIRCUMFERENTER BY VAGNARELLI OF URBINO, ABOUT 1640.

(1436-76) described the torquetum and assigned Geber as inventor about 1145. It was used as early as 1540 by Apianus in Ingolstadt. The theodolite was developed by Leonard Digges before 1571. There is no real distinction between these instruments. The use of a clinometer on a plane table by Praetorius (Richter) (1537-1616) at Wittenberg was of this same period.

There is only one torquetum in the Museum but it is an excellent piece, A.M. 187 (Fig. 40). It is signed "P. Danfrie." This may possibly

be the Philippe Danfrie, the inventor of the Graphometer, but may be of a later generation. The instrument may be used as an alt-azimuth or as an equatorial adaptable for any latitude, setting by the quadrant. On the small compass the four cardinal points are marked with letters of Italian wind directions except that east is indicated with the more unusual square cross.

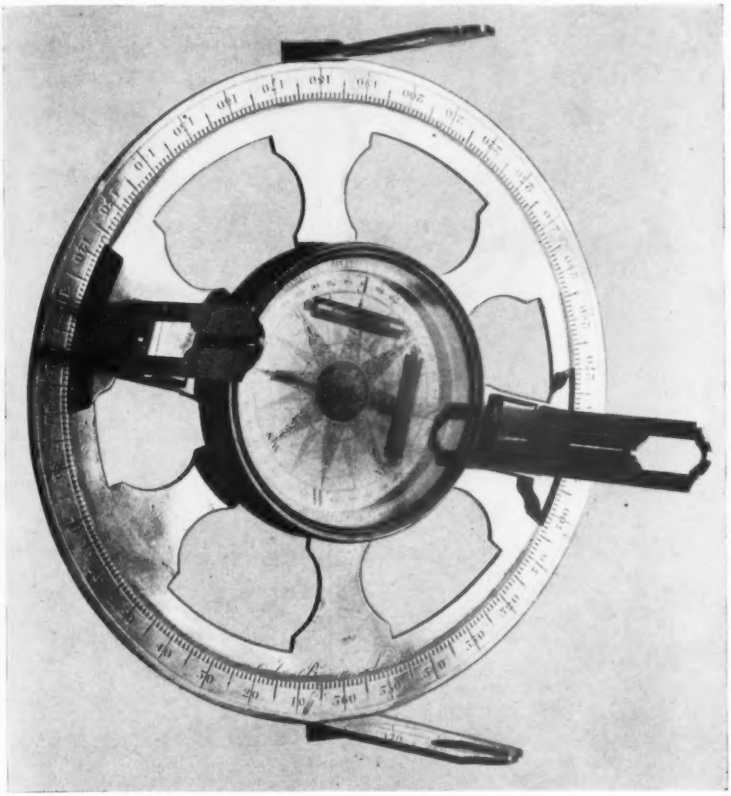


FIG. 39. A.M. 156. A CIRCUMFERENTER AND COMPASS BY J. BENNETT, LONDON, ABOUT 1750.

The Museum has two theodolites, gifts of the U. S. Navy, one by Ertel & Sohn, the second by Stackpole. The latter instrument was used in transit of Venus expeditions in 1874 and 1882.

Level. The level was invented in the year 1666 by the French scholar, traveller, orientalist, Melchisedech Thévenot (c. 1620-1692). It

received scant attention in France, but was adopted in England and Italy and from those countries reappeared in France. An early level, about 1700, equipped with a telescope, A.M. 191, by "Gio. Rodella Regio Macchinista Padoua" is shown in the back of the cabinet of Fig. 36. A level by "Meurand A Paris 1788", A.M. 190, in all essentials like that of Antoine Chézy[18] (1718-1798), engineer and director of l'École

Fig. 40. A.M. 187. A Torquetum by P. Danfrie, of Early Years of the Sixteenth Century.

des Ponts et Chaussées, and called by him a "niveau de pente" is shown in Fig. 41. This is equipped with movable pinnule and crosswires, the forerunner of stadia wires.

The last geodetic instrument on which comment will be made is one which might equally well be used in astronomy, a quadrant by "DuBois a Paris aux Genies," A.M. 439 (Fig. 42). It has levelling screws, mo-

[18] Laussedat, loc. cit. p. 295, Fig. 101.

tions in both altitude and azimuth with tangent screws and verniers.

The Collection has many alidades: by "Pigeon a Lyon," "Fabris Bovolente," "Giuseppe Stefani"; clinometers; scales of various sorts including some very interesting standard ells from various cities, whose variety emphasizes the importance of a Bureau of Standards.

Mathematical Instruments. The Museum contains a large assortment of mathematical instruments for measurements of various sorts, for

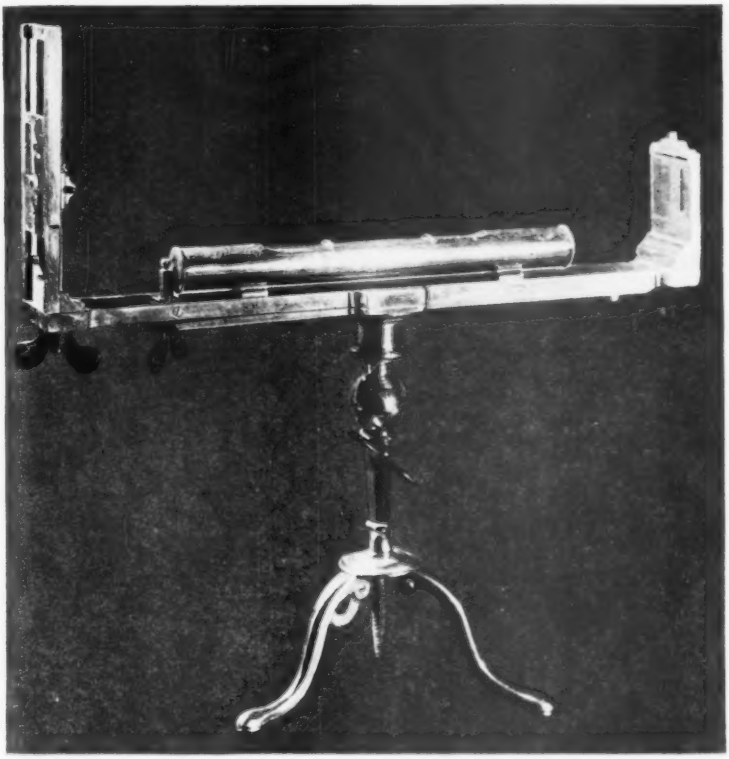


FIG. 41. A.M. 190. A LEVEL, "NIVEAU DE PENTE" BY MEURAND OF PARIS, 1788.

drawing, for mapping, etc. Samples to illustrate the variety are presented in Fig. 43. Here are seen calipers; reduction compasses; proportional compasses (Galileo is often called the inventor but they go farther back, to Commandino of Urbino 1568, or Guidubaldo del Monte); very useful three-legged compasses, unfortunately now little used; parallel rulers; range finders using the cross-staff principle; a beautiful set of miniature drawing tools in silver by "Chapotot a Paris"

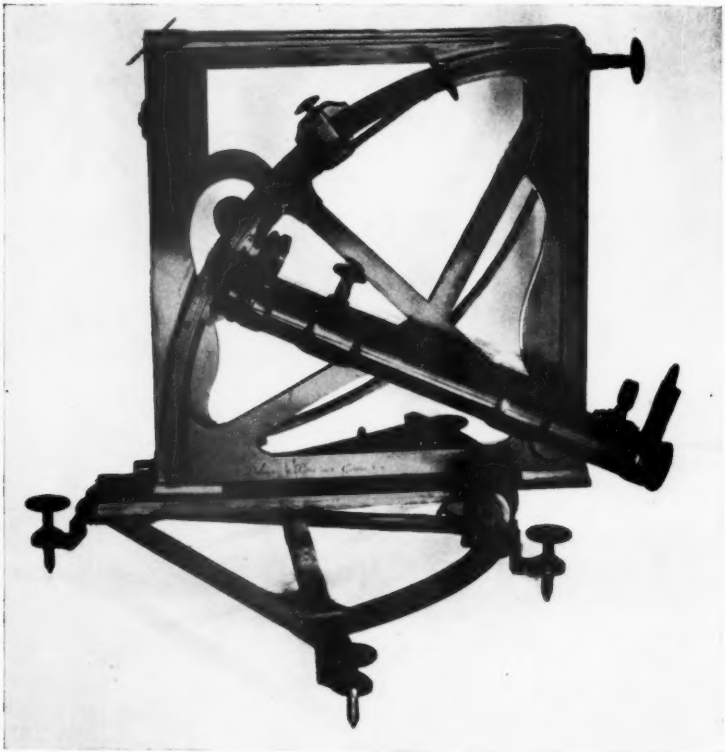


FIG. 42. A.M. 439. A TELESCOPIC QUADRANT BY DUBOIS OF PARIS, ABOUT 1780.

FIG. 43. A GROUP OF MATHEMATICAL INSTRUMENTS.

(c. 1700—an associate of Jean Picard); a pedometer by Willebrandt; ellipsographs; trammel bar by "Dominicus Lusuerg F. Romae 1699," to be used with a cross in drawing ellipses; and a semicircular diopter and quadrant in its leather case inscribed "Capitan Petrv Spera Deo" (South German c. 1580).

In Fig. 44 is shown a set of instruments, A.M. 49, by Butterfield, an Englishman who worked in Paris between 1670-86. The pieces are not

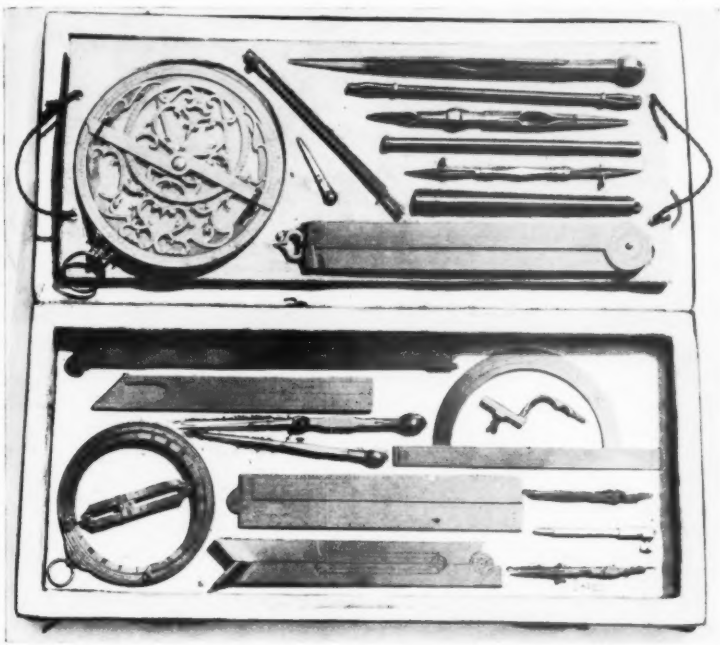


FIG. 44. A.M. 49. A SET OF OBSERVING AND DRAWING INSTRUMENTS WITH PIECES BY BUTTERFIELD, BOS, PIGEON.

all of his construction: the astrolabe, A.M. 33 A, is signed "Ioannes Bos. I(nvenit) 1597 die Martii," the collapsible square at the bottom of the box is by "Pigeon A Paris," the protractor by "Jacobus Lusuerg Mutinensis (of Modena) 1672." The square by Pigeon is one of the most skilfully executed pieces of the entire Collection, the joints are scarcely discernible.

(To be continued.)

Planet Notes for December, 1932

By CLIFFORD E. SMITH

The *Sun* will be moving from the western part of Ophiuchus to the central part of Sagittarius. The winter solstice, which marks the beginning of winter, will occur on December 21 at $7^h\ 15^m$ P.M., C.S.T. The distance from the earth to the sun will be decreasing slowly during this period, changing from about 91.6 to about 91.3 million miles. The position of the sun on the first and last days of the month will be, respectively: R.A. $16^h\ 27^m$, Decl. $-21°\ 45'$; and R.A. $18^h\ 40^m$, Decl. $-23°\ 08'$.

The phenomena of the *Moon* will occur as follows:

First Quarter	Dec.	4	at 4 P.M.	C.S.T.
Full Moon		12	" 8 P.M.	"
Last Quarter		20	" 2 P.M.	"
New Moon		27	" 5 A.M.	"
Apogee		10	" 6 A.M.	"
Perigee		25	" 8 P.M.	"

Mercury will be in southern Ophiuchus. During the first part of the month it will be near the sun in apparent position since inferior conjunction will occur on December 4, but by Christmas time it will be rising about an hour and a half before the sun, since greatest elongation west will occur on December 23 ($22°\ 0'$). On Christmas Day Mercury will be in conjunction with the moon (Mercury $7°$ N). During the first part of the month the distance from the earth to Mercury will be about 65 million miles and the apparent diameter of Mercury will be about $9\frac{1}{2}$ seconds of arc. By the end of the month the distance will have increased to about 105 million miles, and the apparent diameter will have decreased to about 6 seconds of arc.

Venus will be a morning star in Libra and Scorpio during this period, rising about two hours before the sun. The distance of the earth from Venus will increase from about 120 to about 135 million miles, and the apparent diameter will decrease from about 13 seconds to about $11\frac{1}{2}$ seconds of arc. Conjunction with the moon will occur on December 25 (Venus $6\frac{1}{2}°$ N).

Mars will be a morning star in southern Leo and, during the middle of the month, it will be on the meridian about 5:00 A.M., Standard Time. On December 1 the distance of Mars from the earth will be about 120 million miles and this distance will decrease about 30 million miles during this period. Likewise the apparent diameter, which will be about $7\frac{1}{4}$ seconds of arc at the beginning of the month, will increase about two seconds of arc. Conjunction with Neptune will occur on December 5 (Mars $1\frac{1}{2}°$ N), and conjunction with the moon will occur on December 19 (Mars $3\frac{1}{2}°$ N).

Jupiter will be moving with an apparent easterly motion in southern Leo. During the middle of the month it will be on the meridian about 6:00 A.M. Standard Time, since quadrature west of the sun will occur on December 14. The distance of Jupiter from the earth will be about 490 million miles, and its apparent diameter will be about 35 seconds of arc. Conjunction with the moon will occur on December 20 (Jupiter $2\frac{1}{2}°$ N).

Saturn will be an evening object in western Capricornus setting, during the middle of the month, about two hours after the sun. Its distance from the earth

will be about 990 million miles, and its apparent diameter will be about 14 seconds of arc. Conjunction with the moon will occur on December 1 and on December 29 (Saturn between 2½° and 3° N).

Uranus will be in eastern Pisces, and its apparent motion will be retrograde until December 28. During the middle of the month its distance from the earth will be about 1800 million miles and its apparent diameter will be about 3½ seconds of arc, and it will be on the meridian about 7^h 40^m P.M., Standard Time. On December 8 Uranus will be in conjunction with the moon (Uranus 4° S).

Neptune will continue to be in the morning sky in southern Leo. During the first part of the month it will rise about midnight since quadrature west of the sun will occur on December 2. Its distance from the earth will be about 2800 million miles, and its apparent diameter will be about 2½ seconds of arc. On December 5 it will be in conjunction with Mars, and on December 19 it will be in conjunction with the moon (Neptune 1° N).

Variable Stars

Monthly Report of the American Association of Variable Star Observers for September, 1932

The present report is a record breaker from the standpoint of number of observations contained and frequency of estimates on the majority of variables observed; 6650 observations having been secured on 439 variables. This is due in a great measure to the amount of clear weather prevailing during the summer months over the entire globe. Nearly 400 observations each are recorded for the irregular variables R Coronae Borealis, R Scuti, and SS Cygni. This indicates that there is little chance that any of the caprices of these stars will escape the attention of our observers.

We welcome initial contributions this month from Messrs. Beck, Eliason, Lee, and Percival. The reports from Peltier, Jones, and Lacchini are especially noteworthy.

Several of the A.A.V.S.O. members attended the recent meeting of the International Astronomical Union held at Cambridge, Massachusetts, and took a more or less active part in the discussions of some of the commissions. Probably the most far reaching, even if informal meeting of the variable star observers was held when representatives of the English, French, and American Variable Star Observers gathered together one afternoon to discuss the matter of the selection of new visual sequences for variables not yet under regular observation. This informal committee, with Dr. S. A. Mitchell of the Leander McCormick Observatory as chairman and Leon Campbell of the Harvard Observatory as Secretary, recommended in so far as possible and within its own confines at least, that the selection of suitable sequences and the determination of comparison star magnitudes thereof, be supervised by this committee. In this way, unnecessary duplication of sequences, and standards of uniformity and reliability of magnitudes would be assured. It is hoped that other variable star obervers will join with this committee towards a common unity of purpose. Members of this committee include besides those mentioned Mr. Felix de Roy, Director of the Variable

VARIABLE STAR OBSERVATIONS RECEIVED DURING SEPTEMBER, 1932.

July 0 = J.D. 2426889; August 0 = J.D. 2426920; September 0 = J.D. 2426951.

J.D.Est.Obs.	J.D.Est.Obs.	J.D.Est.Obs.	J.D.Est.Obs.	J.D.Est.Obs.	J.D.Est.Obs
V Scl	T And	R And	RW And	W Cas	U Psc
003339	001726	001838	004132	004958	011712
900[13.3 Bl	956 8.7 Br	946 12.8 Pt	892 13.6 Bk	943 11.0 El	946 11.2 Pt
S Scl	956 8.4 Gy	950 13.4 El	922 14.8 Bk	943 11.2 Me	958 11.5 Pt
001032	961 8.9 Wd	956 13.5 Br	931[13.5 Pt	945 11.1 Ah	RZ Per
900 10.1 Bl	962 8.6 Gy	958 12.7 Pt	946[13.1 Pt	946 11.2 Pt	012350
948 9.0 Pt	T Cas	S Tuc	956[13.9 Br	946 11.5 Jo	913 12.3 L
X And	001755	*001862*	V And	949 11.3 Ko	927 11.6 L
001046	892 10.0 Mn	887[13.2 Sl	004435	949 11.1 El	946 9.9 Jo
893 10.5 Jo	893 9.3 Jo	900[13.5 Bl	892 14.3 Bk	958 11.2 Pt	956 10.1 Br
898 11.1 Jo	894 10.0 We	919[13.2 En	912 13.8 L	U Tuc	R Psc
914 11.6 Jo	895 9.8 Jo	S Cet	922 14.5 Bk	*005475*	012502
917 12.0 Jo	896 10.0 Mn	*001900*	927 13.5 L	864 12.9 Sl	923 10.3 Pt
921 12.0 Jo	898 10.0 Jo	908 10.5 L	956 12.6 Br	885 11.6 Sl	931 9.1 Pt
924 11.8 Jo	898 9.6 Ah	920 9.7 Jo	X Scl	900 10.0 Bl	945 8.7 Ah
934 11.8 Bw	899 9.6 Ah	922 9.6 Me	*004435*	914 10.4 En	946 8.3 Jo
953 12.6 Br	908 10.1 Jo	923 9.6 Pt	900[13.2 Bl	915 10.3 Sl	946 8.5 Pt
T Cet	908 9.6 L	924 8.9 Jo	RR And	919 10.3 En	949 8.8 Mc
001620	910 10.2 Mn	926 9.4 L	004533	Z Cet	958 8.1 Pt
913 5.7 L	911 10.1 Mc	928 8.7 Jo	892 13.9 Bk	*010102*	RU And
928 6.1 L	912 10.1 Mc	931 8.7 Pt	922 12.0 Bk	908 10.6 L	013238
940 6.2 An	912 9.9 Jo	942 8.6 L	956 11.1 Br	923 11.0 Pt	892 12.7 Bk
949 6.1 An	915 10.0 Mc	943 8.4 Jo	RV Cas	926 11.3 L	908 13.4 L
949 6.5 L	915 10.4 Mn	946 8.5 Pt	004746a	931 11.4 Pt	926 13.4 L
T And	916 11.1 Ah	949 8.6 An	892 15.1 Bk	942 11.8 L	926 13.2 Pt
001726	917 10.8 Jo	958 8.3 Pt	931[13.2 Pt	946 11.8 Pt	931 13.4 Pt
894 11.5 Jo	918 10.3 Mc	T Phe	958[13.2 Pt	958 12.5 Pt	946 14.0 Pt
898 10.0 Jo	918 11.2 L	*002546*	— Cas	U Scl	956 13.4 Br
901 10.0 Jo	919 10.5 Mn	900[13.2 Bl	004746b	*010630*	958 13.3 Pt
912 9.4 Jo	920 10.6 Jo	W Scl	923 10.5 Pt	900[12.0 Bl	Y And
914 9.2 Jo	922 10.2 Mc	*002833*	931 10.5 Pt	U And	013338
914 9.1 We	923 11.0 Pt	900 13.1 Bl	946 10.6 Pt	010940	892 14.5 Bk
917 9.0 Jo	924 11.4 Jo	Y Cep	958 11.0 Pt	892 14.6 Bk	913 12.9 L
920 9.1 Gy	927 11.6 L	003179	W Cas	922 14.6 Bk	922 12.5 Bk
920 8.8 Jo	930 12.0 Ah	955[13.6 Br	004958	956 13.9 Br	926 12.0 Pt
922 8.6 Me	931 11.3 Pt	U Cas	893 10.3 Jo	UZ And	927 11.5 L
923 8.5 Pt	939 11.0 Jo	004047a	895 10.6 Jo	011041	931 11.5 Pt
923 8.8 Hu	943 11.0 Jo	893 9.6 Jo	898 10.5 Jo	912 11.7 L	945 9.9 Jo
924 8.2 Gy	944 10.3 Mc	898 9.8 Jo	900 10.8 Ko	926 10.7 Jo	946 9.3 Pt
924 8.4 Jo	945 11.0 Mn	908 8.5 L	908 10.7 Jo	927 10.7 L	957 8.5 Me
925 9.0 Hu	946 11.8 Pt	912 8.5 Jo	912 10.4 Jo	934 9.9 Bw	958 9.1 Pt
928 8.2 Jo	946 10.3 Mc	917 8.4 Jo	912 10.7 Ko	956 9.6 Br	X Cas
928 8.0 Th	946 11.8 Jo	918 8.2 L	913 10.5 Pc	957 9.9 Me	014958
930 8.1 Th	949 10.4 Mc	919 8.4 Me	916 11.0 Ah	S Psc	893 11.5 Jo
931 7.9 Th	950 11.1 Mn	920 8.4 Jo	917 10.8 Jo	011208	898 11.5 Jo
931 8.0 Pt	951 10.4 Mc	923 8.0 Pt	919 10.7 Ko	926 11.1 L	898 12.0 Bn
935 8.2 Th	952 10.5 Mc	927 8.2 L	920 11.5 Jo	949 10.1 L	901 11.0 Jo
937 8.2 Th	953 10.5 Mc	928 8.3 Jo	923 11.2 Pt	S Cas	913 11.0 Jo
939 8.2 Th	958 11.8 Pt	931 7.8 Pt	924 11.3 Jo	011272	914 11.6 Jo
939 8.0 Jo	R And	934 8.4 Bw	928 10.8 Jo	923 13.5 Pt	914 11.9 Bn
941 8.3 Wd	001838	939 8.5 Jo	930 11.1 Ah	931 13.5 Pt	918 11.5 Jo
942 8.1 Th	898 12.0 Jo	940 8.4 Me	931 10.8 Pt	946 13.9 Pt	920 12.2 Bn
942 8.5 Gy	898 11.5 Ah	943 8.3 Jo	931 11.1 El	U Psc	920 11.5 Jo
943 8.1 Jo	914 12.5 Jo	946 8.5 Jo	934 10.7 Bw	011712	924 11.5 Jo
944 8.3 Th	923 12.4 Pt	946 8.2 Pt	939 11.1 El	908 11.9 L	925 12.2 Bn
946 7.9 Jo	931 12.3 Pt	956 8.5 Br	939 11.0 Jo	923 11.4 Pt	926 12.0 Pt
946 8.1 Pt	940 12.9 El	957 9.1 Sf	939 11.5 Ko	926 11.1 L	931 12.0 Pt
948 8.2 Th	941 13.2 El	958 8.9 Pt	941 11.1 El	931 11.2 Pt	943 11.5 Jo
951 7.9 Th	946 13.6 El		943 11.2 Jo	942 10.9 L	943 12.0 Me

VARIABLE STAR OBSERVATIONS RECEIVED DURING SEPTEMBER, 1932.

J.D.	Est.	Obs.	J.D.	Est.	Obs.	J.D.	Est.	Obs.	J.D.	Est.	Obs.	J.D.	Est.	Obs.	J.D.	Est.	Obs.
X CAS			**R ARI**			**W AND**			**S PER**			**R TRI**			**W PER**		
014958			021024			021143a			021558			023133			024356		
958	11.5	Pt	899	8.1	Ah	946	8.0	Pt	893	9.5	Jo	895	9.4	Jo	924	9.1	Ry
RR ARI			900	8.0	Ah	956	8.3	Gy	894	9.5	Sz	898	9.6	Jo	924	9.1	Cy
015023			902	8.0	Ah	958	8.2	Pt	898	9.4	Ah	898	9.5	Ah	927	9.0	Pt
946	5.9	L	908	7.6	L	**T PER**			901	9.6	Jo	902	9.6	Ah	928	8.8	Jo
949	6.1	L	914	7.9	Ah	021258			912	9.8	Jo	914	9.9	Jo	929	9.1	Ry
952	5.7	L	916	7.8	Ah	893	8.7	Jo	916	9.8	Ah	916	11.0	Ah	931	9.3	Me
U PER			921	7.5	Jo	898	8.8	Ah	918	9.8	Sz	919	10.0	Jo	931	9.2	Ah
015254			922	8.1	Me	901	8.6	Jo	918	9.9	Jo	920	11.2	Gy	931	8.9	Pt
893	8.8	Jo	924	8.2	Jo	912	8.5	Jo	920	9.7	Jo	920	10.7	Jo	933	9.3	Cy
899	9.0	Ah	924	7.4	Cy	916	8.7	Ah	922	10.1	Me	924	10.8	Jo	935	9.1	Ko
901	8.5	Jo	926	7.6	L	918	8.5	Jo	924	9.4	Jo	924	11.7	Gy	939	8.8	Jo
902	8.9	Ah	926	8.7	We	920	8.5	Jo	926	10.2	Pt	927	11.3	Pt	939	9.0	Ry
910	8.8	Mc	927	8.2	Pt	922	8.8	Me	928	9.6	Jo	931	11.0	Pt	939	9.2	Me
911	8.9	Mc	928	8.0	Jo	924	8.6	Jo	931	9.6	Pt	931	11.3	Gy	940	9.0	Cy
912	8.6	Jo	928	7.5	Cy	926	8.8	Pt	931	9.7	Ah	943	11.6	Jo	943	9.0	Ry
912	8.8	Mc	930	8.0	Ah	928	8.6	Jo	932	10.2	Sz	945	11.5	Ah	943	8.8	Jo
915	8.8	Mc	931	8.0	Ah	931	8.5	Pt	939	9.3	Jo	946	11.6	Ah	944	9.5	Mc
915	8.8	Ah	931	8.1	Pt	931	8.7	Ah	943	9.3	Jo	946	11.5	Pt	946	9.2	Ah
918	8.5	Jo	932	8.1	Ah	943	8.4	Jo	945	9.6	Ah	948	11.3	Jo	946	8.8	Jo
918	8.6	Mc	932	7.6	Cy	945	8.8	Ah	946	10.4	El	958	11.4	Me	946	9.6	Mc
920	8.8	Jo	939	8.7	L	946	8.5	Jo	946	9.2	Jo	958	11.5	Pt	946	8.8	Pt
922	8.8	Me	940	8.4	Ah	946	8.8	Pt	946	9.5	Pt	**T ARI**			949	9.2	Ko
922	8.5	Mc	943	9.0	We	958	8.7	Pt	950	10.3	El	024217			949	9.3	Cy
924	8.7	Jo	943	8.6	Jo	**Z CEP**			955	10.2	El	902	7.8	Ko	949	9.1	Ry
924	8.9	Ry	945	7.8	Cy	021281			958	10.2	Pt	913	7.2	Ko	949	9.8	Mc
926	8.5	Pt	945	8.6	Ah	913[	13.0	Pc	961	10.2	Me	922	8.0	Me	951	9.7	Mc
928	8.5	Jo	946	8.7	Ah	931[	12.5	Pt	**R CET**			924	7.9	Jo	952	9.5	Mc
929	8.6	Ry	946	9.1	Pt	956[	13.5	Br	*022000*			928	7.8	Jo	953	9.7	Mc
930	8.7	Ah	946	8.8	Jo	**o CET**			913	11.2	L	935	7.8	Ko	957	9.1	Me
931	8.6	Pt	949	8.1	Cy	*021403*			928	12.7	L	943	8.2	Jo	958	8.8	Pt
933	8.8	Ah	958	9.9	Pt	865	4.8	Sl	949	13.1	L	945	8.6	Ah	960	9.1	Ry
934	8.7	Bw	**W AND**			887	6.0	Sl	**RR PER**			946	8.7	Ah	**R HOR**		
939	8.1	Jo	021143a			897	6.0	Cy	022150			946	8.6	Jo	*025050*		
939	8.6	Ry	894	7.8	Ah	908	6.7	L	913	13.2	L	948	8.9	Me	865	5.6	Sl
940	8.6	Ah	898	7.6	Ah	916	6.9	Si	927	12.8	Pt	949	8.7	Ko	887	5.8	Sl
943	8.2	Jo	898	7.6	Jo	919	7.6	We	927	12.9	L	957	9.0	Me	900	5.0	Bl
943	8.6	Ry	900	8.1	Ah	920	7.3	Gy	931	12.5	Pt	**W PER**			**T HOR**		
944	8.4	Mc	901	7.4	Jo	922	7.4	Me	946	12.6	Pt	024356			*025751*		
945	8.6	Ah	902	7.5	Ah	924	7.4	Jo	958	11.6	Pt	891	9.1	Cy	887	12.4	Sl
946	8.6	Ah	911	7.3	Ah	924	7.6	Gy	**U CET**			893	8.8	Jo	900	12.1	Bl
946	8.4	Jo	913	7.7	Jo	925	7.0	Si	*022813*			897	9.2	Cy	**U ARI**		
946	8.5	Mc	914	7.3	Ah	925	7.9	We	913	8.2	L	898	9.1	Ah	030514		
946	8.5	Pt	919	7.1	Gy	926	7.5	Pt	920	8.3	Gy	898	8.9	Jo	894	8.4	L
949	8.3	Mc	920	7.6	Jo	926	7.2	L	924	8.4	Gy	901	8.7	Jo	926	9.3	L
949	8.6	Ry	924	7.3	Gy	928	7.5	Jo	926	7.9	L	910	9.5	Mc	949	10.3	L
951	8.2	Mc	926	7.6	Jo	929	7.5	Si	927	8.1	Pt	911	9.3	Mc	**X CET**		
952	8.2	Mc	927	7.1	Pt	931	7.0	Pt	931	8.5	Pt	912	9.3	Mc	*031401*		
953	8.1	Mc	930	8.0	Ah	939	7.7	L	942	8.6	L	912	8.8	Jo	908	11.6	L
958	8.4	Pt	931	7.4	Pt	943	8.0	Jo	946	8.5	Pt	913	8.9	Ko	926	12.3	L
960	8.5	Ry	931	7.3	Gy	945	7.8	Ah	953	8.7	Gy	913	9.2	Cy	927	12.4	Pt
S ARI			932	7.8	Ah	946	8.0	Jo	958	9.0	Pt	915	9.3	Mc	931	12.2	Pt
015912			933	7.8	Ah	946	8.2	Pt	**RR CEP**			916	9.2	Ah	946	11.6	Pt
913[	13.7	L	940	8.3	Ah	948	8.2	Si	022980			918	9.5	Mc	949	12.3	L
927[	13.7	L	943	8.4	Jo	949	8.3	Si	892	14.4	Bk	918	8.9	Jo	958	12.0	Pt
R ARI			945	8.5	Ah	953	8.2	Gy	922	14.7	Bk	920	8.7	Jo	**Y PER**		
021024			946	8.6	Ah	956	8.5	Gy	931[	12.5	Pt	922	9.5	Mc	032043		
898	8.3	Ah	946	8.1	Jo	958	8.0	Pt	958[	12.9	Pt	924	8.8	Jo	895	10.3	Jo

VARIABLE STAR OBSERVATIONS RECEIVED DURING SEPTEMBER, 1932.

J.D.	Est.	Obs.	J.D.	Est.	Obs.	J.D.	Est.	Obs.	J.D.	Est.	Obs.	J.D.	Est.	Obs.	J.D.	Est.	Obs.
Y PER			**X PER**			**T CAM**			**R LEP**			**T ORI**			**U AUR**		
032043			034930			043065			*045514*			*053005a*			053531		
898	10.4	Jo	946	6.5	Mc	934	8.6	Ko	939	7.8	L	947	10.2	L	927	11.5	L
898	10.6	Ah	949	6.3	Mc	941	8.8	Jo	948	7.5	Pt	948	10.6	Pt	927	11.5	Pt
902	10.6	Ah	951	6.2	Mc	942	8.6	L	**V ORI**			948	10.0	Me	932	11.4	Pt
912	10.2	Jo	952	6.0	Mc	943	8.6	Jo	050003			949	10.1	Me	947	12.0	L
913	10.7	Ko	953	6.4	Mc	946	8.6	Jo	926[13.3		L	949	10.2	L	948	12.3	Pt
914	10.3	Jo	**R TAU**			948	8.8	Pt	948	13.8	Pt	951	10.6	Pt	958	12.1	Pt
914	10.6	Ah	042209			958	8.5	Pt	958[12.8		Pt	958	9.8	Me	959	12.2	Me
918	10.0	Mc	922	11.2	Bk	**RX TAU**			**T LEP**			959	10.0	Me	**SU TAU**		
919	10.6	Jo	927	12.2	Pt	043208			*050022*			960	10.2	Pt	054319		
920	10.5	Jo	931	11.5	Pt	913	9.8	L	948	11.8	Pt	961	10.0	Me	913	9.3	L
922	10.3	Mc	931	11.6	Me	927	10.6	L	**R AUR**			**AN ORI**			926	9.4	L
922	10.8	Me	948	11.9	Pt	931	10.5	Me	050953			*053005t*			927	9.5	Pt
924	10.5	Jo	958	12.3	Pt	942	11.2	L	913[12.5		Jo	949	11.6	Me	928	9.5	Pt
927	10.8	Pt	**W TAU**			948	10.9	Pt	932[12.8		Pt	**S CAM**			931	9.5	Me
928	10.5	Jo	042215			958	11.8	Pt	948	13.0	Pt	053068			931	9.4	Pt
931	11.0	Pt	913	10.8	L	958	11.3	Me	958	12.6	Pt	893	8.5	Jo	932	9.4	Pt
931	10.8	Ah	924	10.6	Cy	**R RET**			**S AUR**			898	8.6	Jo	932	9.4	L
935	10.7	Ko	924	10.0	Jo	*043263*			052034			912	8.4	Jo	933	9.4	Pt
941	10.4	Jo	927	10.4	L	864	11.3	Sl	913	9.0	Ko	914	8.2	Jo	934	9.5	Pt
944	10.3	Mc	927	10.2	Pt	887	10.0	Sl	924	8.9	Jo	918	8.2	Jo	939	9.4	L
945	10.5	Jo	931	9.8	Pt	895	9.8	Bl	927	8.5	Pt	920	8.4	Jo	945	9.7	L
945	10.6	Ah	932	10.2	Cy	903	9.0	Bl	932	8.4	Pt	924	8.4	Jo	945	9.3	Cy
946	10.7	Ah	939	10.2	Jo	919	8.3	Bl	935	8.7	Ko	927	8.6	Pt	947	9.6	L
946	11.1	Pt	943	10.0	Jo	**X CAM**			943	8.6	Jo	928	8.1	Jo	948	9.7	Me
946	10.4	Mc	945	10.2	Cy	043274			946	9.3	Ah	940	8.5	Me	948	9.4	Pt
949	10.4	Mc	946	9.9	Jo	894	11.5	L	948	8.8	Jo	941	8.5	Jo	949	9.7	Me
949	10.6	Ko	948	10.2	Pt	913	12.1	L	948	8.2	Pt	943	8.6	Jo	951	9.5	Pt
951	10.5	Mc	949	10.3	L	925	11.0	Jo	958	8.5	Pt	948	8.5	Jo	952	9.3	Cy
952	10.5	Mc	951	10.2	Cy	926	11.1	L	**W AUR**			948	8.7	Pt	955	9.4	Pt
953	10.2	Mc	958	9.9	Pt	927	10.9	Pt	052036			958	8.5	Pt	956	9.4	Pt
958	10.9	Pt	**S TAU**			928	11.0	Jo	913	13.1	L	**RR TAU**			958	9.7	Pt
R PER			042309			932	10.7	Pt	922	12.9	Bk	053326			958	9.5	Me
032335			922	10.1	Bk	940	9.8	Me	926	12.5	L	913	11.5	L	959	9.6	Me
913	11.0	Jo	927	10.0	Pt	942	9.6	L	927	12.3	Pt	916	10.9	L	959	9.7	Pt
913	10.7	L	931	9.9	Me	943	9.7	Jo	932	12.0	Pt	917	11.1	L	960	9.5	Pt
917	11.4	Jo	931	9.8	Pt	946	9.0	Jo	939	11.5	L	926	10.7	L	961	9.5	Pt
919	11.7	Jo	948	9.6	Jo	948	8.6	Pt	946	10.2	Jo	932	10.8	L	961	9.5	Me
924	11.5	Jo	948	9.2	Pt	955	8.2	GD	948	10.0	Jo	933	10.9	Pt	**Z TAU**		
927	12.0	Pt	958	9.3	Pt	958	8.2	Pt	948	10.1	Pt	934	10.9	Pt	054615a		
927	12.0	L	961	9.8	Me	**R DOR**			958	9.1	Pt	939	10.8	L	926[13.5		L
928	11.5	Jo	**T CAM**			*043562*			**S ORI**			947	10.9	L	949	13.7	L
931	11.8	Pt	043065			864	5.1	Sl	*052404*			948	10.9	Pt	959[12.8		Me
946	12.6	El	893	9.0	Jo	887	5.2	Sl	932	9.6	Pt	951	11.0	Pt	**RU TAU**		
946	12.4	Pt	894	9.4	L	895	5.3	Bl	948	8.7	Pt	955	11.6	Pt	054615c		
949	12.6	L	898	8.9	Jo	903	5.8	Bl	**T ORI**			956	11.5	Pt	926[13.0		L
950	12.8	El	898	9.2	Ko	**V TAU**			*053005a*			958	11.9	Pt	949	13.0	L
955	13.0	El	911	8.8	Ko	044617			926	10.1	L	958	12.1	Me	959	13.0	Me
958	13.0	Pt	912	8.7	Jo	927	10.0	Pt	928	9.8	Pt	959	12.2	Me	**α ORI**		
NOV PER			913	8.9	L	948	8.7	Jo	931	9.8	Pt	959	12.0	Pt	054907		
032443			914	8.8	Jo	948	9.0	Pt	931	9.9	Me	960	11.7	Pt	916	0.9	Si
927	12.9	Pt	918	8.8	Jo	958	9.0	Pt	932	9.8	Pt	961	12.1	Me	917	0.9	Si
931	12.6	Pt	919	8.8	Ko	**R ORI**			932	10.0	L	**RU AUR**			925	1.1	Si
946	12.6	Pt	920	8.7	Jo	045307			933	9.9	Pt	053337			929	0.9	Si
958	13.0	Pt	924	8.7	Jo	926	12.5	L	934	9.9	Pt	932[12.4		Pt	949	0.6	Si
T FOR			926	8.7	L	949	12.0	L	939	10.2	L	958[12.4		Pt	**U ORI**		
032528			927	8.7	Pt	**R LEP**			940	10.0	Me	**U AUR** .			054920a		
926	9.0	L	928	8.7	Jo	*045514*			942	10.1	L	053531			927	12.5	Pt
942	9.1	L	932	8.9	Pt	887	6.3	Sl	945	10.4	L	913	11.0	L	932	12.0	Pt

VARIABLE STAR OBSERVATIONS RECEIVED DURING SEPTEMBER, 1932.

J.D.Est.Obs. J.D.Est.Obs. J.D.Est.Obs. J.D.Est.Obs. J.D.Est.Obs. J.D.Est.Obs.

U ORI
054920a
948 11.1 Pt
958 10.2 Pt

V CAM
054974
892 15.0 Bk
922[15.0 Bk
932 13.9 L
948[12.6 Pt
958[12.6 Pt

Z AUR
055353
916 10.2 Ah
918 9.5 Mc
922 9.7 Mc
923 10.4 Pt
926 10.4 Pt
927 10.4 Pt
928 10.6 Pt
928 10.6 Jo
931 10.5 Pt
932 10.3 Pt
933 10.4 Pt
934 10.4 Pt
935 10.6 Pt
938 10.4 Pt
939 10.4 Me
941 10.4 Jo
941 10.4 Pt
943 10.4 Pt
946 10.3 Pt
946 10.2 Mc
946 10.5 Ah
948 10.0 Jo
948 10.4 Pt
949 10.3 Mc
951 10.4 Mc
951 10.4 Pt
952 10.3 Mc
955 10.2 Pt
956 10.3 Pt
958 10.3 Pt
958 10.0 Me
959 10.2 Me
959 10.3 Pt
960 10.2 Pt
961 10.4 Pt

R OCT
055686
864 12.0 Sl
886 11.3 Sl
888 11.5 Ht
895 11.4 Bl
897 11.5 Ht
903 11.1 Bl
915 10.7 Ht
919 11.1 Bl

X AUR
060450
908 8.4 L
926 10.4 L
927 11.4 Pt
932 11.3 Pt
947 12.2 L
948 11.8 Pt
958 12.0 Pt

V AUR
061647
913 8.8 L
928 8.8 L
949 10.4 L

V MON
061702
948 9.0 Pt
959 9.2 Me
960 9.5 Pt

AG AUR
062047
913 10.1 L
928 9.5 L
942 9.3 L

UU AUR
062938
949 5.4 Mc

NOV PIC
063462
862 8.6 En
867 8.7 En
869 8.3 Ht
879 8.7 En
882 8.4 Ht
887 8.7 En
888 8.3 Ht
895 8.3 Ht

S LYN
063558
913 10.7 L
927 12.0 Pt
928 11.9 L
948 13.1 Pt

Y MON
065111
949 13.4 L
960 13.5 Pt

X MON
065208
949 9.1 L

R LYN
065355
913 10.1 L
927 10.3 Pt
928 9.8 L
948 9.8 Pt
949 9.6 L

RS GEM
065530
949 11.1 Me

RS GEM
065530
951 11.4 Pt
958 11.3 Me

Z CMA
065911
864 10.1 Sl
878 10.3 Sl

V CMI
070109
932 [9.6 L
951 8.9 Pt

R GEM
070122a
951[12.7 Pt
960[12.7 Pt

Z GEM
070122b
951 12.5 Pt
960 12.6 Pt

TW GEM
070122c
951 8.3 Pt
960 8.4 Pt

R CMI
070310
943 9.1 L
951 9.7 Pt

R VOL
070772
862 12.2 En
869 11.7 Ht
879 12.2 En
882 11.9 Ht
887 13.0 En
888 12.0 Ht
897 12.0 Ht

L_2 PUP
071044
864 5.0 Sl
871 5.0 Sl
878 5.1 Sl
885 5.0 Sl

RR MON
071201
959 12.1 Me

V GEM
071713
951 10.5 Pt

S CMI
072708
948 8.1 Me
944 9.5 Ch
951 8.3 Pt

T CMI
072811
951 12.5 Pt

Z PUP
072820b
862 8.9 En

S VOL
073173
862 11.0 En
869 10.0 Ht
880 9.5 En
882 9.6 Ht
887 9.1 En
888 9.2 Ht
895 8.6 Bl
895 8.7 Ht
903 8.3 Bl
915 8.7 Ht
919 8.6 Bl

U CMI
073508
951 10.3 Pt

S GEM
073723
849 11.5 Ch
951 12.0 Pt
960 12.3 Pt

W PUP
074241
862 11.0 En
869 9.9 Ht
879 9.4 En
882 9.4 Ht
887 9.0 En
888 9.2 Ht
895 9.0 Bl
897 9.2 Ht
903 9.2 Bl
919 10.3 Bl

T GEM
074323
849 9.1 Ch
951 9.7 Pt
960 10.0 Pt

R CNC
081112
843 6.8 Ch
951 8.9 Pt

R CHA
082476
865 13.8 Sl
879 13.4 Sl
886 13.1 Sl
910 12.4 En
914 11.9 En
915 12.4 Ht
915 11.8 Sl
919 11.7 Bl

X UMA
083350
895[14.7 Bk
922[13.5 Bk

S HYA
084803
849 10.2 Ch

V UMA
090151
908 9.8 L
911 10.8 Mc
912 10.7 Mc
915 10.8 Mc
918 10.9 Mc
918 9.7 L
922 10.9 Mc
925 9.7 L
940 9.7 L
940 9.7 Gt
946 10.7 Mc
949 10.7 Mc
951 10.8 Mc
952 10.6 Mc

RW CAR
091868
862 12.0 En
869 11.6 Ht
882 12.1 Ht
888 12.6 Ht
895 12.4 Bl
919 12.6 Bl

Y VEL
092551
862[12.9 En
882[12.9 Ht
888[12.9 Ht
895[12.9 Bl
908[12.1 En
915[12.4 Ht

R CAR
092962
862 5.2 En
865 4.7 Sl
869 4.3 Ht
869 4.7 En
871 4.6 Sl
874 4.3 En
878 4.4 Sl
879 4.4 En
880 4.5 En
882 4.7 Ht
886 4.5 Sl
887 4.7 En
888 4.3 Ht
894 4.6 Sl
895 4.2 Ht
895 4.9 Bl
897 4.7 En
903 4.8 Bl
907 4.9 En
908 5.1 En
914 5.4 En
915 5.5 Sl
915 5.6 Ht
919 5.6 Bl

X HYA
093014
882[11.0 Ch

Y DRA
093178
882 8.9 Ch
887 8.8 Cy
893 8.6 Bk
895 8.2 L
900 8.5 Cy
913 8.5 Cy
914 8.4 L
923 8.6 L
924 8.7 Cy
928 8.6 Bk
932 9.2 L
940 9.4 Cy
950 10.1 Cy

R LMI
093934
847 7.6 Ch
882 6.4 Ch
887 6.8 Hi

RR HYA
094023
862 10.2 En
880 10.8 En
887 11.0 En
908[12.4 En

R LEO
094211
843 7.4 Ch
882 9.0 Ch

L CAR
094262
858 4.1 Sl
861 4.1 Sl
866 4.1 Sl
878 3.5 Sl
885 3.8 Sl
915 3.5 Sl

Y HYA
094622
862 8.0 En
880 8.0 En
887 8.0 En
908 7.5 En

Z VEL
094953
862 12.8 En
864 13.1 Sl
879 13.8 Sl
886 14.0 Sl
895[12.8 Ht
908[12.1 En
919[12.8 Bl

V LEO
095421
882 10.8 Ch
888 11.8 Cy

VARIABLE STAR OBSERVATIONS RECEIVED DURING SEPTEMBER, 1932.

J.D.Est.Obs.	J.D.Est.Obs.	J.D.Est.Obs.	J.D.Est.Obs.	J.D.Est.Obs.	J.D.Est.Obs.
RR CAR	Z CAR	R UMA	R UMA	RS CEN	T VIR
095458	*101058a*	103769	103769	*111661*	*120905*
862 8.3 En	882[12.3 Ht	911 8.7 Ah	946 10.3 Mc	889 10.9 Ht	891[13.0 L
869 8.7 Ht	895[12.6 Bl	912 8.6 Jo	949 10.6 Mc	893 11.2 Ht	895[14.1 Bk
880 8.0 En	910[12.3 En	912 9.0 Wd	949 10.5 El	895 11.6 Bl	R CRV
882 8.5 Ht	915[12.3 Ht	912 8.7 Mc	950 10.7 Mn	903 12.2 Bl	*121418*
887 8.0 En	W VEL	912 8.7 El	951 10.1 Pt	908 12.7 En	864 11.0 Sl
888 8.3 Ht	*101153*	914 8.2 Je	951 10.1 Wd	914 12.7 En	878 9.7 Sl
895 8.4 Ht	862 8.4 En	914 8.7 Ah	951 10.7 Cy	920 12.9 Bl	885 9.3 Sl
908 7.9 En	869 8.5 Ht	915 9.6 Mn	951 10.4 Hf	X CEN	SS VIR
915 7.8 Ht	880 8.4 En	915 9.0 Mc	951 10.8 Mc	*114441*	*122001*
RV CAR	882 8.7 Ht	916 8.8 Pc	952 10.8 Mc	862 7.0 En	891 7.2 Ko
095563	887 8.6 En	916 8.5 Cy	953 10.9 Mc	880 7.5 En	892 7.5 Sz
862 11.8 En	888 8.5 Ht	916 8.8 Ah	953 10.6 Gy	882 7.4 Ht	900 6.8 Ko
869 12.5 Ht	895 8.6 Bl	916 8.9 Pt	956 10.6 Gy	887 7.8 En	908 6.6 L
880 12.5 En	895 8.6 Ht	917 8.7 Jo	960 10.7 Wd	889 7.4 Ht	912 6.3 Ko
882 12.9 Ht	903 8.6 Bl	917 9.2 Wd	V HYA	893 7.2 Ht	918 6.8 L
887 12.5 En	908 9.1 En	918 8.4 Sz	*104620*	895 7.9 Bl	919 6.5 Ko
888 13.0 Ht	914 9.1 En	918 9.1 Mc	847 8.0 Ch	903 8.2 Bl	925 6.2 L
895 13.1 Ht	915 9.3 Ht	919 9.0 Hf	862 8.2 En	910 8.8 En	T CVN
895 12.8 Bl	919 9.5 Bl	919 10.1 Mn	880 8.4 En	914 9.0 En	122532
908[12.5 En	RZ CAR	919 9.0 Wd	882 8.8 Ch	914 9.0 Ht	882 10.0 Ch
915[13.1 Ht	*103270*	920 8.8 Gy	887 8.7 En	918 9.1 Ht	893 9.9 Jo
919[13.1 Bl	862[13.1 En	920 9.1 Hi	895 9.0 Bl	920 8.4 Bl	895 9.9 Jo
S CAR	882[13.1 Ht	920 8.8 Jo	903 8.6 Bl	AD CEN	899 10.1 Hi
100661	888[13.6 Ht	921 8.7 We	910 8.8 En	*114858*	901 9.8 Jo
862 6.0 En	908[12.7 En	922 10.1 Mn	914 9.0 En	881 9.5 Ht	908 10.1 Cy
864 5.7 Sl	915[13.1 Ht	922 9.0 Mc	919 8.8 Bl	887 9.5 Ht	914 9.9 Jo
869 6.0 Ht	R UMA	924 8.9 Gy	RS HYA	887 9.1 En	916 10.5 Pt
874 6.0 En	103769	924 8.7 Cy	*104628*	893 9.5 Ht	919 10.2 Cy
878 5.9 Sl	843 7.5 Ch	924 8.8 El	862[12.5 En	915 9.2 Ht	919 10.1 Jo
879 6.0 En	882 7.7 Ch	924 8.9 Jo	880[12.5 En	W CEN	920 10.5 Hi
882 6.0 Ht	887 8.3 Hi	927 10.1 Mn	910[12.5 En	*115058*	920 10.4 Jo
886 6.0 Sl	887 8.0 Cy	928 9.0 Jo	W LEO	862 8.2 En	923 10.7 Me
887 6.2 En	892 7.9 We	928 9.2 Pt	104814	880 9.1 En	924 10.5 Cy
888 6.4 Ht	892 7.9 Sz	928 9.3 Wd	883 13.6 Ch	881 9.1 Ht	924 10.2 Jo
895 5.8 Bl	892 8.3 Mn	928 9.5 Sh	RS CAR	887 9.1 Ht	928 10.4 Jo
895 6.4 Ht	893 7.8 Jo	930 9.7 Ah	*110361*	887 9.4 En	928 11.0 Pt
897 6.7 En	893 7.9 Ah	931 9.5 Gy	862[12.3 En	893 9.6 Ht	940 11.2 Pt
903 6.7 Bl	894 8.0 Sz	931 9.3 El	910[12.3 En	895 9.4 Bl	951 11.0 Pt
907 6.9 En	894 8.1 Ah	932 9.7 Wd	S LEO	903 10.4 Bl	Y VIR
914 7.5 En	895 7.8 Jo	932 9.8 Ah	110506	908 11.0 En	*122803*
915 7.7 Ht	896 8.3 Mn	932 9.5 Sz	882 10.2 Ch	914 11.5 En	881 13.3 Ch
915 6.9 Sl	898 7.9 Jo	933 9.5 El	888 9.8 Cy	915 11.5 Ht	891 13.5 Bk
919 7.8 Bl	898 8.1 Ah	935 10.0 Wd	RY CAR	920 11.6 Bl	895 13.8 Bk
U UMA	899 8.2 Ah	939 9.6 Jo	*111561*	R COM	U CEN
100860	899 8.3 Cy	939 9.7 El	862[13.1 En	115919	*122854*
892 6.4 Mn	899 8.5 Hi	940 9.8 Ah	882[13.1 Ht	882 11.6 Ch	881 11.8 Ht
896 6.3 Mn	900 8.2 Ah	940 10.0 We	887[13.1 En	887 11.5 Hi	887 10.3 Ht
910 6.2 Mn	901 8.0 Jo	940 10.3 Mn	895[13.5 Bl	895 12.0 Bk	887 10.6 En
915 6.3 Mn	902 8.3 Ah	940 10.1 Cy	908[13.1 En	916 12.8 Pt	893 10.0 Ht
919 6.4 Mn	903 8.4 Wd	941 10.2 Wd	915[13.1 Ht	922 12.8 Bk	895 10.5 Bl
922 6.4 Mn	907 8.8 Wd	942 10.1 El	920[13.1 Bl	SU VIR	903 9.8 Bl
927 6.4 Mn	907 8.7 Hf	942 10.1 Gy	RS CEN	120012	908 10.1 En
940 6.4 Mn	907 7.7 Je	944 9.9 Jo	*111661*	827 12.2 Br	914 10.0 En
945 6.5 Mn	908 8.4 We	944 10.0 Mc	862 9.5 En	882 9.6 Ch	915 9.7 Ht
950 6.5 Mn	908 8.4 Jo	945 10.5 Mn	869 9.8 Ht	895 10.4 L	920 9.3 Bl
Z CAR	908 8.7 Mn	945 10.0 Ah	879 10.1 En	914 11.3 L	T UMA
101058a	909 8.4 Cy	946 10.2 Ah	882 10.1 Ht	916 10.8 Pt	123160
862[12.3 En	911 8.8 Mc	946 10.6 El	887 10.5 En	923 11.8 L	827 12.5 Br

VARIABLE STAR OBSERVATIONS RECEIVED DURING SEPTEMBER, 1932.

J.D.Est.Obs.	J.D.Est.Obs.	J.D.Est.Obs.	J.D.Est.Obs.	J.D.Est.Obs.	J.D.Est.Obs.
T UMA	T UMA	RS UMA	S UMA	U VIR	R HYA
123160	123160	123459	123961	124606	*132422*
881 9.0 Ch	940 10.0 Mc	908 12.1 Jo	932 10.2 Sz	923 9.9 L	903 8.5 Bl
892 9.3 Mn	940 9.8 Mn	912 12.5 Jo	933 10.2 El	RV VIR	910 8.5 En
893 9.1 Ah	940 10.0 Pt	913 12.8 Cy	935 9.5 Hf	*130212*	914 8.8 Ht
893 8.5 We	941 9.4 Wd	916 13.0 Pt	935 9.7 Sh	883 13.3 Ch	916 9.0 En
893 9.6 Bk	942 10.0 El	920 13.2 Ry	935 9.6 Wd	895 14.0 Bk	918 8.7 Ht
894 8.9 Ah	942 9.2 Gy	920 13.3 Bn	939 9.5 Jo	U OCT	920 8.7 Bl
896 9.2 Bf	942 9.6 Th	923 10.9 Bc	939 9.9 El	*131283*	S VIR
896 9.2 Bc	943 9.5 We	924 13.5 Bn	940 9.2 Ah	862 12.4 En	*132706*
896 9.1 Mn	944 9.9 Wd	925 13.2 Ry	940 9.7 El	869 12.9 En	849 11.5 Ch
898 9.1 Ah	944 9.5 Jo	928 13.0 Pt	940 10.2 Ma	895 13.3 Bl	864 11.1 Sl
899 9.1 Ah	944 9.9 Sh	928 13.5 Bk	940 10.3 Pt	910 13.6 En	864 10.3 En
899 9.1 Th	945 9.9 Mn	939 13.5 El	941 9.4 Wd	915 12.9 Ht	878 9.6 Sl
900 9.1 Ah	945 9.8 Ah	940 13.6 El	942 9.0 We	920 12.6 Bl	881 9.4 Ch
902 9.2 Ah	946 9.9 Ah	940 13.9 Ma	942 9.4 El	V CVN	881 9.2 En
903 8.9 Bg	946 9.5 Jo	940 13.1 Pt	942 9.2 Th	131546	882 9.4 Ht
903 9.1 Wd	946 10.1 El	941 13.5 El	942 9.8 Gy	893 7.7 Th	885 8.4 Sl
907 9.0 Wd	948 10.0 Gy	949 10.4 Bc	944 9.3 Jo	899 7.7 Th	887 8.7 En
907 9.1 Ah	949 9.9 Bc	S UMA	944 8.8 Mc	900 8.0 Th	892 8.7 Mn
907 9.1 Hf	950 10.2 Mn	123961	944 9.2 Sh	901 8.0 GD	894 8.1 Sz
908 8.3 We	951 10.2 Pt	847 9.8 Ch	944 9.4 Wd	911 7.7 GD	893 8.2 Ht
908 9.0 Mn	951 9.9 Wd	881 11.2 Ch	945 9.0 Ah	913 7.8 GD	896 8.7 Mn
911 9.0 Ah	951 10.0 Hf	893 11.4 Ah	945 9.8 Mn	918 8.0 GD	908 7.8 Mn
912 9.0 Wd	953 10.0 Gy	893 11.8 Bk	946 9.4 Jo	923 7.7 GD	910 7.2 En
914 9.2 Ah	956 10.0 Gy	893 11.2 Jo	946 8.7 Mc	925 8.1 GD	913 7.0 Je
915 9.3 Ah	960 10.7 Wd	894 11.5 Sz	946 9.2 El	928 8.5 Th	914 7.0 Je
915 9.0 Mn	R VIR	895 11.6 Jo	946 9.2 Ah	930 8.7 Th	914 7.1 Ht
916 9.5 Pt	123307	896 11.8 Bc	948 9.3 Gy	939 8.1 GD	916 6.9 Pt
917 9.2 Wd	542 10.4 Hl	896 12.0 Bf	949 9.2 El	942 8.7 Th	916 6.7 En
919 9.1 Wd	881 9.0 Ch	898 11.4 Jo	949 8.7 Mc	943 8.4 GD	918 7.3 Ht
919 9.1 Hf	890 8.8 Si	899 11.8 Ah	950 9.3 Mn	948 8.7 Th	928 7.4 Ad
919 9.2 Mn	892 9.9 Mn	901 11.6 Jo	951 5.9 Wd	955 8.0 GD	928 7.0 Pt
920 9.3 Gy	896 10.0 Mn	903 11.5 Bg	951 9.0 Hf	W VIR	RV CEN
920 9.0 Jo	907 10.5 Hf	907 11.3 Wd	951 8.6 Mc	*132002*	*133155*
921 8.7 We	907 10.3 Wd	907 11.5 Hf	951 8.6 Pt	891 9.7 Ko	864 9.2 En
922 9.3 Mn	910 10.2 Mn	908 11.4 Jo	952 8.7 Mc	895 10.4 Bk	881 9.7 En
923 9.5 Bc	915 10.4 Mn	912 11.4 Jo	953 8.6 Mc	912 10.6 Ko	881 10.3 Ht
924 9.2 Hf	916 10.8 Pt	912 11.4 Wd	953 9.0 Gy	916 9.6 Ko	887 10.3 Ht
924 9.3 Gy	RS UMA	916 11.5 Ah	955 8.7 El	919 9.5 Ko	887 9.5 En
924 9.3 Wd	123459	916 11.8 Pt	956 8.9 Gy	921 9.5 Bk	893 10.0 Ht
924 9.0 Jo	847 9.2 Ch	917 11.2 Jo	960 8.6 Hf	V VIR	895 9.6 Bl
927 9.4 Mn	881 10.7 Ch	917 11.2 El	960 8.7 Wd	*132202*	903 9.7 Bl
928 9.5 Th	887 10.8 Cy	917 11.3 Wd	960 8.5 Sh	895 14.6 Bk	910 9.9 En
928 8.9 Jo	891 12.0 Bn	919 11.4 Wd	962 8.7 Gy	921 14.2 Bk	915 10.5 Ht
928 9.5 Bk	892 11.1 Mn	919 11.2 Sz	RU VIR	R HYA	916 10.0 En
928 9.1 Wd	893 10.7 Jo	920 11.2 Gy	124204	*132422*	920 10.0 Bl
928 9.1 Sh	893 11.5 Ah	920 10.9 Jo	887 10.8 Cy	849 6.6 Ch	T UMI
928 9.6 Pt	893 12.4 Bk	924 11.0 Jo	893 11.2 L	862 7.5 En	133273
929 9.6 Ah	895 11.6 Jo	924 10.7 El	908 11.0 Cy	864 7.1 Sl	893 14.5 Bk
931 9.7 Gy	896 11.1 Mn	924 10.8 Gy	914 11.2 L	874 7.6 En	908 14.2 L
931 9.5 Ah	896 9.8 Bc	925 10.5 El	916 11.3 Pt	878 7.4 Sl	923 14.5 L
932 9.6 Ah	896 9.8 Bf	927 10.4 El	923 11.6 L	881 8.2 En	928 15.0 Bk
933 9.6 El	898 12.3 Bn	928 10.8 Jo	924 11.8 Cy	882 7.9 Ht	T CEN
935 9.1 Hf	898 12.0 Jo	928 10.6 Pt	U VIR	882 7.7 Ch	*133633*
935 9.3 Sh	899 11.7 Cy	928 10.4 Bk	124606	885 7.5 Sl	858 6.3 Sl
935 9.3 Wd	901 12.3 Jo	929 10.4 Ah	881 12.6 Ch	887 8.3 En	864 6.1 Sl
939 9.4 Jo	903 12.2 Bg	930 10.4 El	908 11.0 L	893 7.6 L	864 6.3 En
940 9.7 Ah	907 12.3 Wd	931 10.3 Ah	916 10.4 Pt	893 8.0 Ht	871 6.2 Sl
940 10.2 El	907 12.3 Hf	931 10.2 Gy	917 10.0 L	895 8.0 Bl	878 6.2 Sl

VARIABLE STAR OBSERVATIONS RECEIVED DURING SEPTEMBER, 1932.

J.D.Est.Obs.	J.D.Est.Obs.	J.D.Est.Obs.	J.D.Est.Obs.	J.D.Est.Obs.	J.D.Est.Obs.
T CEN	Z Boo	U UMi	V Boo	V Boo	V LIB
133633	140113	141567	142539a	142539a	*143417*
881 6.6 En	918 13.9 L	912 10.6 Sf	894 10.0 We	950 9.5 Mn	925 11.8 L
887 6.8 En	922 14.6 Bk	913 10.0 Jo	895 9.2 Jo	951 9.2 Pt	S LUP
885 6.4 Sl	923 14.0 L	913 10.6 Cy	896 9.4 Mn	951 9.9 Mc	*144646a*
893 7.2 Ht	940[13.4 Ma	914 10.8 Ah	898 9.2 Jo	952 9.8 Mc	866[12.1 Sl
895 7.2 Bl	Z VIR	915 10.9 Mn	899 9.3 Cy	957 9.2 Sf	888 12.5 En
903 7.6 Bl	*140512*	916 10.6 Pt	899 9.4 Ah	R CAM	910[12.1 En
910 8.2 En	883 10.2 Ch	917 10.4 Jo	900 9.5 Ah	142584	U Boo
911 7.9 Sl	893 10.3 L	919 10.9 Mn	907 9.5 Ah	893 13.0 Bk	144918
914 8.0 Ht	913 10.7 L	920 10.4 Jo	907 9.3 Cy	926 11.7 Me	857 11.4 Ch
916 8.2 En	916 10.5 Pt	922 11.1 Mn	908 9.4 Jo	926 11.8 GD	887 11.4 Cy
918 7.9 Ht	925 10.8 L	922 10.7 We	910 9.5 Mn	927 12.0 Bc	891 11.6 Bk
920 7.5 Bl	RU HYA	923 10.7 Me	911 10.0 Mc	928 11.5 Bk	892 11.6 Bk
RT CEN	*140528*	924 10.8 Cy	912 9.3 Jo	950 9.5 We	894 11.2 Bk
134236	864 10.6 En	924 10.5 Jo	912 9.7 Sf	R Boo	895 11.2 Bk
864 12.3 En	881 9.2 En	925 10.6 Sz	912 9.3 GD	143227	900 11.1 Cy
881 13.0 En	888 8.9 En	927 11.1 Mn	913 9.3 GD	845 8.0 Ch	909 11.3 Bw
887 12.4 En	895 8.0 Bl	928 10.9 Pt	914 9.4 Ah	885 7.8 Ch	909 10.7 Mp
895 12.9 Bl	903 8.1 Bl	928 10.6 Jo	915 9.5 Mn	893 8.6 Ah	913 10.7 Cy
910 11.4 En	910 8.3 En	931 10.9 Ah	916 9.6 Ah	893 7.9 Jo	913 10.7 Jo
914 11.2 Ht	914 7.8 Ht	940 11.6 Cy	916 9.2 Pt	894 8.5 Ah	916 11.0 We
916 11.4 En	916 8.3 En	940 10.8 Me	917 9.4 Jo	894 8.3 Sz	917 10.8 Jo
918 10.9 Ht	918 7.9 Ht	940 11.0 Pt	918 9.1 GD	895 8.0 Jo	921 10.8 Bk
920 12.2 Bl	920 7.8 Bl	943 10.8 Jo	918 10.3 Mc	898 8.4 Jo	922 10.7 Bk
R CVN	R CEN	945 10.9 Ah	918 9.7 Cy	899 8.7 Ah	924 10.6 Cy
134440	*140959*	945 11.2 Mn	919 10.0 Mc	900 8.7 Ah	924 10.8 Mp
883 11.4 Ch	864 7.5 En	946 11.3 Jo	920 9.3 Jo	907 9.0 Ah	925 11.0 We
900 12.0 Ah	865 6.9 Sl	946 11.0 Ah	922 9.9 We	907 9.3 Wd	932 11.0 Bw
916 12.1 Pt	878 7.1 Sl	950 11.3 Mn	922 9.6 Mn	907 9.0 Hf	940 10.7 Cy
921 12.0 Jo	881 8.1 Ht	951 10.8 Cy	922 10.6 Mc	908 8.8 Jo	Y LUP
924 12.5 Jo	881 7.6 En	951 11.0 Pt	922 9.6 Me	912 8.8 Jo	*145254*
925 11.8 Gy	886 7.0 Sl	S Boo	924 9.6 Cy	912 9.5 Wd	864[13.7 En
928 12.0 Pt	887 8.3 Ht	141954	924 9.5 Jo	914 9.4 Ah	895[13.7 Bl
940 12.2 Pt	887 8.1 En	893 10.7 Jo	925 9.2 GD	916 9.5 Ah	916[13.7 En
944 12.3 Jo	893 8.4 Ht	895 10.7 Jo	927 9.6 Mn	916 9.5 Pt	S APS
951 11.7 Pt	895 8.2 Bl	895 11.8 L	928 9.2 Jo	917 9.5 Jo	*145971*
956 11.5 Gy	900 7.7 En	898 11.6 Jo	928 9.6 Pt	918 8.8 GD	865[14.0 Sl
RX CEN	903 7.7 Bl	908 12.5 Jo	929 9.7 Ah	918 9.4 Sz	879[12.5 En
134536	907 7.9 En	914 12.3 L	932 9.8 Ah	919 9.1 Hf	887[13.4 Ht
887[13.1 En	910 7.9 En	916 12.5 Pt	933 9.4 Cy	919 9.8 Wd	895[13.4 Bl
910[13.1 En	911 7.4 Sl	923 12.4 L	939 9.3 Cy	920 9.3 Jo	903[13.4 Bl
918[13.1 Ht	915 7.6 Ht	928 12.8 Pt	939 9.2 Jo	922 10.1 Me	914[13.4 Ht
920[13.1 Bl	916 7.9 En	939 13.3 L	939 9.8 Sf	923 10.0 Hu	916[13.2 En
T APS	920 7.5 Bl	940 13.2 Pt	940 9.6 Ah	924 10.2 Hf	920 12.9 Bl
134677	U UMi	951 13.3 Pt	940 9.6 Me	924 10.2 Wd	RT LIB
862[12.7 En	141567	RS VIR	940 9.7 Mn	924 9.6 Jo	*150018*
881[12.7 En	887 10.0 Cy	142205	940 9.5 Pt	928 9.9 Jo	893 9.3 Bk
888[13.2 Ht	892 9.6 Mn	883 13.4 Ch	942 9.4 GD	928 10.2 Pt	908 9.6 Pr
895[13.2 Bl	893 10.2 We	908 13.5 L	943 9.4 Jo	930 10.5 Ah	913 10.0 Sf
910[12.7 En	893 10.2 Hi	917 13.1 L	944 10.4 Mc	939 10.5 Jo	914 7.4 We
915[13.2 Ht	893 9.8 Jo	923 12.7 L	945 9.6 Mn	940 11.3 Pt	916 10.3 Pt
RR VIR	893 10.2 Ah	932 12.3 L	945 9.3 Ah	941 11.4 Wd	923 10.5 Hu
135908	894 10.5 Ah	V Boo	946 9.5 Ah	943 11.0 Jo	942 11.5 Pt
893 12.9 Bk	895 10.0 Jo	142539a	946 10.4 Mc	945 11.7 Ah	951 11.8 Pt
916[12.8 Pt	896 9.7 Mn	848 9.1 Ch	948 9.2 Jo	948 11.4 Jo	T LIB
Z Boo	898 9.9 Jo	887 9.5 Cy	949 10.0 Mc	951 11.9 Pt	*150519*
140113	899 10.2 Cy	893 9.0 Jo	950 9.5 An	V LIB	857 12.0 Ch
895 15.1 Bk	899 10.6 Ah	893 9.3 Ah	950 8.8 Be	*143417*	893 14.2 Bk
908 14.0 L	908 10.7 Mn	894 9.2 Ah	950 9.3 Cy	893 13.9 L	916[12.5 Pt

VARIABLE STAR OBSERVATIONS RECEIVED DURING SEPTEMBER, 1932.

J.D.Est.Obs.	J.D.Est.Obs.	J.D.Est.Obs.	J.D.Est.Obs.	J.D.Est.Obs.	J.D.Est.Obs.
T LIB	S CRB	RU LIB	S UMI	R CRB	R CRB
150519	151731	*152714*	153378	154428	154428
942[12.9 Pt	916 12.5 Pc	942 9.4 Be	934 9.1 Ko	891 6.0 L	907 6.0 Si
951[12.9 Pt	917 12.5 El	951 9.5 Pt	939 9.8 Sf	892 5.9 We	907 6.0 Me
Y LIB	919 12.3 Jo	R NOR	940 9.7 Ah	892 6.0 Si	907 6.0 Cy
150605	925 12.4 El	*152849*	940 9.8 Me	893 6.0 Jo	907 6.0 Ah
891 8.2 Oy	928 12.3 Pt	864 7.3 En	940 9.4 Pt	893 6.0 Be	907 5.8 Pt
895 7.8 Oy	930 12.5 El	881 7.8 En	941 8.9 Jo	893 6.0 Bc	908 6.0 Be
895 7.6 L	932 12.1 Sz	881 7.5 Ht	942 9.7 Gy	893 6.0 Bf	908 6.0 Pc
907 8.1 Oy	939 11.6 El	887 7.7 Ht	943 10.0 Ko	893 6.0 Me	908 6.0 We
913 8.0 L	940 11.8 Pt	888 7.8 En	944 9.0 Jo	893 6.0 Ah	908 5.7 Mn
916 8.3 Pt	940 11.5 El	893 8.0 Ht	945 9.8 Ah	893 5.9 L	908 6.0 Me
923 8.8 Hu	941 11.3 Jo	895 7.6 Bl	946 9.9 Ah	894 6.1 Sz	908 6.0 Cy
923 8.3 L	944 11.3 Sf	903 7.6 Bl	948 8.9 Jo	894 6.0 Bc	908 6.0 Pt
931 8.7 L	945 9.9 Mn	910 8.7 En	951 10.0 Pt	894 6.0 Si	908 6.0 L
942 9.7 Pt	945 11.2 Jo	916 8.9 En	953 9.9 Gy	894 6.2 Ah	909 6.0 Pc
951 9.8 Pt	945 10.9 Ah	918 9.1 Ht	956 9.8 Gy	895 6.0 Si	909 6.0 Ko
U CRB	946 10.0 Bc	920 8.8 Bl	957 10.5 Sf	895 6.0 Cy	909 6.0 Me
151432	946 10.0 Bf	X LIB	U LIB	895 6.0 L	909 6.0 Cy
893 7.9 Bc	946 10.6 El	*153020*	*153620a*	896 6.0 Oy	910 5.9 Mc
922 7.5 Mn	946 11.0 Jo	893 12.6 L	896 9.8 Bl	896 6.0 Bc	910 6.0 Me
927 7.5 Mn	948 11.5 Jo	895 12.8 Bl	903 9.5 Bl	897 5.8 Ko	910 6.5 Je
940 7.3 Mn	949 10.0 Bc	913 11.2 L	909 10.1 Mp	897 6.0 Cy	911 6.0 GD
945 7.2 Mn	949 10.2 El	923 10.7 L	920 10.9 Bl	898 6.0 Jo	911 5.9 Ko
950 7.2 Mn	950 9.8 Mn	950 10.7 L	923 10.6 Hu	898 6.0 Be	912 5.9 L
957 7.9 Me	951 10.1 Pt	W LIB	924 10.8 Mp	898 6.0 Cy	912 6.0 Jo
S LIB	951 9.8 We	*153215*	T NOR	898 6.1 Ah	912 6.1 Wd
151520	955 9.8 El	893 14.3 L	*153654*	899 6.1 Ah	912 5.8 Pt
857 8.5 Ch	957 9.6 Me	913 12.3 L	864 7.2 En	899 6.0 Cy	912 6.0 Mc
895 8.6 L	957 9.7 Sf	920 11.9 Bl	881 7.3 En	899 6.0 Si	912 6.0 Me
913 8.9 L	RS LIB	923 11.6 L	881 7.0 Ht	899 6.0 Bc	913 6.0 Me
916 8.9 Pt	*151822*	950 12.3 L	887 7.1 Ht	899 6.0 Bf	913 5.9 Ko
923 9.1 L	864 7.9 En	S UMI	888 7.3 En	900 6.0 Ko	913 6.0 Si
950 10.6 L	881 7.8 En	153378	893 7.2 Ht	900 6.0 Cy	913 6.0 Pc
S SER	881 7.9 Ht	841 9.5 Ch	910 8.3 En	900 6.1 Ah	913 6.0 Be
151714	887 7.5 Ht	893 8.5 Jo	914 8.2 Ht	901 6.0 Jo	913 6.0 Cy
908 11.9 L	888 7.5 En	893 8.0 We	916 8.6 En	901 6.0 Be	913 6.0 L
913 11.5 Jo	893 7.7 Ht	894 8.7 Ah	918 8.6 Ht	901 6.0 Cy	914 6.0 Jo
915 11.9 Md	895 7.7 Bl	897 8.5 Ko	Z LIB	902 5.9 Ko	914 6.0 Pc
916 11.6 Pt	903 7.0 Bl	898 8.4 Jo	*154020*	902 6.0 Cy	914 6.5 Je
917 11.9 L	908 7.7 L	899 8.6 Ah	896[12.7 Bl	902 6.2 Ah	914 6.0 Si
917 11.0 Jo	910 7.7 En	902 8.7 Ah	R CRB	902 5.8 Pt	914 5.8 Me
921 11.0 Jo	914 8.0 Ht	906 8.6 Ko	154428	902 6.0 Pc	914 6.0 Cy
923 11.9 L	916 8.1 En	908 8.6 We	841 6.0 Ch	903 5.9 Si	914 6.1 Ah
923 10.8 Pr	917 7.7 L	912 8.8 Sf	863 6.0 Ch	903 5.9 Pt	914 5.9 Pt
925 11.5 Bw	918 8.1 Ht	913 8.6 Jo	870 5.9 Lg	903 6.0 Cy	914 5.9 L
931 10.9 Bw	920 8.0 Bl	914 9.0 Ah	881 6.0 Oy	904 6.1 Bc	915 6.0 Be
932 11.3 L	923 8.3 L	916 9.0 Ah	883 6.0 Ch	904 6.2 Bf	915 5.9 Mn
940 11.4 Ma	938 9.3 L	916 8.8 Ko	885 6.0 Le	904 6.0 Cy	915 5.9 Mc
942 10.6 Pt	RU LIB	916 9.0 Pt	886 6.1 Le	905 6.0 Pc	915 5.8 Me
943 10.9 Md	*152714*	918 8.4 Jo	887 6.0 Cy	905 6.1 Bc	915 6.2 Ah
949 10.4 L	891 12.5 L	920 8.7 Gy	888 6.0 Cy	905 6.2 Bf	915 5.9 Pt
951 10.2 Pt	908 11.1 L	920 8.6 Jo	890 6.0 Be	906 6.0 Be	916 6.0 Pc
954 10.7 Md	916 10.8 Pt	922 9.0 We	890 6.0 Bc	906 6.0 Bc	916 5.8 Ko
S CRB	917 10.6 L	924 8.8 Gy	890 6.0 Bf	906 6.0 Ko	916 5.9 Si
151731	923 10.6 L	924 8.8 Jo	890 6.0 Si	906 5.8 Pt	916 6.0 Cy
841 12.2 Ch	926 10.3 Bw	928 8.8 Jo	891 5.9 Oy	907 5.9 Hf	916 6.1 Ah
893 10.5 Bc	932 10.1 L	928 8.8 Pt	891 6.0 Ko	907 6.0 Pc	916 6.0 Pt
911 12.6 El	942 9.4 L	930 9.5 Ah	891 6.0 Si	907 6.5 Je	916 6.1 Rc
916 12.4 Pt	942 9.3 Pt	931 9.6 Gy	891 6.0 Cy	907 5.9 Wd	917 6.0 Pc

VARIABLE STAR OBSERVATIONS RECEIVED DURING SEPTEMBER, 1932.

J.D.Est.	Obs.	J.D.Est.	Obs.	J.D.Est.	Obs.	J.D.Est.	Obs.	J.D.Est.	Obs.	J.D.Est.	Obs.
R CrB 154428								R Ser 154615		V CrB 154639	
917	6.1 Wd	926	5.9 We	939	6.5 Je	948	6.1 Me	863	12.6 Ch	939	8.0 Th
917	6.0 Cy	927	6.1 Pc	939	5.9 Jo	948	5.8 Pt	887	12.7 Cy	940	7.5 Ah
917	6.0 Pt	927	6.0 Me	939	5.9 Ko	948	5.9 Si	913	12.8 Cy	940	7.9 Cy
917	6.0 L	927	6.0 Pt	939	6.0 L	949	5.9 Si	924	12.4 Cy	940	7.0 Pt
918	6.1 Sz	927	6.0 Be	939	6.0 Pt	949	6.0 Pc	925	11.8 Sz	941	7.5 Jo
918	5.9 Mc	927	6.0 Cy	939	5.9 Si	949	6.0 L	940	10.8 Pt	942	7.9 Th
918	5.9 Ko	927	6.0 L	940	6.1 Ah	949	5.9 Me	942	11.0 Cy	942	8.0 Me
918	5.9 Si	927	5.6 Mn	940	6.1 An	950	6.0 Cy	943	11.2 Md	944	7.8 Mc
918	6.0 Me	928	6.1 Ad	940	6.1 Bg	950	6.1 L	950	11.0 Cy	944	7.9 Th
918	6.0 Cy	928	6.1 Me	940	6.0 Cy	950	5.9 Mn	951	10.9 Pt	945	7.5 Ah
918	5.8 Pt	928	6.0 Pt	940	6.0 Gt	950	5.8 Me	954	10.6 Md	946	7.5 Jo
918	6.0 L	928	6.0 Cy	940	6.8 Je	950	5.8 Pt	V CrB 154639		946	7.7 Th
919	6.0 Jo	928	6.0 Jo	940	6.0 L	951	6.0 Bc			946	8.0 Mc
919	5.9 Hf	928	6.0 L	940	6.0 Me	951	6.0 Bf	889	9.1 Cy	946	7.4 Ah
919	5.9 Gy	929	6.0 Me	940	5.8 Mn	951	6.0 Cy	893	8.5 Ah	948	7.4 Jo
919	6.1 Mn	929	6.0 Pt	940	5.9 Pt	951	5.9 Hf	893	8.5 Th	948	7.5 Th
919	6.1 Me	929	6.0 Cy	940	6.0 Si	951	5.9 Mc	894	8.5 Ah	949	7.9 Mc
919	6.0 Cy	929	5.9 L	941	6.0 Cy	951	5.8 Pt	895	7.7 Jo	951	7.7 Mc
919	5.8 Pt	929	6.2 Ah	941	5.9 Ko	951	5.9 Wd	897	8.8 Hi	951	7.8 Cy
920	6.0 Si	930	5.9 Me	941	6.1 Be	952	6.0 Cy	898	7.8 Jo	951	7.0 Pt
920	6.0 Be	930	5.9 Pt	941	5.7 Pt	952	6.0 Mc	898	8.5 Th	952	7.9 Mc
920	6.0 Jo	930	6.1 Ah	941	6.0 Si	952	6.1 Me	899	8.3 Th	953	8.0 Mc
920	6.1 Pc	930	6.0 Cy	941	6.0 Wd	952	5.8 Pt	899	8.3 Ah	953	7.5 Md
920	6.0 Bc	931	5.8 Pt	942	6.1 An	953	6.2 Gy	900	8.2 Ah	R Lib *154715*	
920	6.0 Me	931	6.1 Ah	942	6.1 Gy	953	6.1 Me	900	8.1 Th		
920	6.0 Gy	931	6.0 Bc	942	6.0 L	954	6.0 Me	901	7.7 Jo	891	12.2 Bk
920	6.8 Pt	931	6.0 L	942	6.1 Me	955	6.0 GD	902	8.1 Ah	892	12.2 Bk
921	6.8 Je	932	5.9 Pt	942	5.7 Pt	955	5.8 Pt	903	7.4 Bg	894	12.2 Bk
921	6.0 Be	932	6.2 Hu	942	6.0 Rc	956	5.9 Gy	909	7.8 Mp	895	12.1 Bk
921	6.0 We	932	6.2 Ah	942	6.1 Si	956	6.1 Me	909	8.5 Bw	908	11.5 L
922	6.0 Mc	932	5.9 L	943	6.1 An	956	5.7 Pt	910	8.2 Md	916	11.8 Pt
922	6.0 Me	932	6.0 Me	943	5.9 Bg	957	5.9 Pt	913	7.7 Jo	917	11.6 L
922	6.1 Mn	932	6.1 Sz	943	5.9 Ko	957	6.1 Me	913	8.1 Th	921	11.7 Bk
922	6.0 Si	933	6.0 Bc	943	6.0 L	958	6.0 Me	913	8.0 Cy	922	11.7 Bk
923	6.1 Pc	933	6.0 Cy	943	6.0 Me	958	5.8 Bg	914	7.7 Ah	923	12.0 L
923	6.0 Me	933	5.9 Pt	943	5.6 Pt	958	5.8 Pt	915	8.2 Md	928	11.6 Bk
923	5.8 Pt	934	6.0 Cy	944	6.0 Bc	959	5.8 Bg	916	7.6 Ah	942	12.5 Pt
923	6.0 Hu	934	6.0 Ko	944	5.9 Bf	959	6.1 Me	916	7.4 Pt	950	12.9 L
923	6.0 Bc	934	5.9 Pt	944	6.0 Cy	960	5.8 Bg	918	8.8 Mc	R Lup *154736*	
923	6.0 Cy	935	6.0 Be	944	6.0 Jo	960	5.9 Hf	919	7.6 Jo		
923	6.0 L	935	6.0 Bc	944	6.0 Me	960	5.8 Pt	920	8.8 Hi	864	12.3 Sl
924	6.0 GD	935	5.9 Bf	944	5.7 Pt	960	5.9 Sh	920	7.6 Jo	881	12.0 En
924	6.0 Gy	935	5.9 Hf	944	5.9 Si	961	6.0 Rc	922	8.7 Mc	885	11.7 Sl
924	6.0 Wd	935	5.9 Sh	945	6.2 Ah	961	6.0 Wd	923	8.1 Hu	888	11.8 En
924	6.0 Me	935	5.9 Wd	945	6.0 Cy	962	5.8 Pt	924	7.5 Mp	910	10.5 En
924	6.0 Pt	936	5.9 Ko	945	5.9 Hf	964	5.9 Bg	924	7.4 Bg	918	10.2 En
924	6.0 Be	936	6.0 Si	945	6.8 Je	X CrB 154536		924	7.7 Md	RR Lib *155018*	
924	6.0 Cy	936	6.0 Me	945	6.0 Mn			924	8.2 Cy		
924	6.1 Si	937	5.9 Pt	945	5.7 Pt	899	12.3 Hi	924	7.7 Jo	893	8.2 L
925	6.2 Gy	937	6.0 Cy	946	6.2 Ah	908	12.6 L	928	7.0 Pt	913	9.3 L
925	6.0 Me	938	5.9 Be	946	6.0 Be	909	12.6 Br	928	7.6 Th	916	9.0 Pt
925	6.0 Cy	938	6.0 Gt	946	6.0 Bc	917	12.8 L	929	7.6 Th	923	9.2 Hu
925	6.0 L	938	6.0 L	946	6.0 Bf	920	12.9 Hi	930	7.8 Th	923	9.5 L
925	6.1 Si	938	6.0 Pt	946	5.8 Bg	923	13.0 L	930	7.7 Ah	940	11.1 Ma
925	6.0 Le	938	6.0 Si	946	5.8 Me	940	13.5 Ma	931	7.7 Ah	942	11.2 Pt
926	6.1 Me	939	6.0 Bc	946	5.8 Pt	942	13.1 L	935	7.6 Th	950	11.7 L
926	6.0 Pt	939	6.0 Cy	948	6.0 Gy	951	12.2 Pt	937	7.9 Th	951	11.5 Pt
926	6.0 Cy	939	6.0 Gt	948	6.0 Jo			938	7.7 Md		

VARIABLE STAR OBSERVATIONS RECEIVED DURING SEPTEMBER, 1932.

J.D.Est.Obs.	J.D.Est.Obs.	J.D.Est.Obs.	J.D.Est.Obs.	J.D.Est.Obs.	J.D.Est.Obs.
Z CrB	R Her	SX Her	SX Her	RU Her	V Oph
155229	160118	160325	160325	160625	*162112*
908 13.4 L	916[13.1 Cy	911 8.0 Ko	949 7.9 Ko	945 9.2 Ah	926 7.6 Jo
917 13.1 L	919[12.0 Jo	912 8.0 Pt	949 8.1 Bc	946 9.1 Ah	928 7.6 Jo
919 12.3 Jo	920[12.5 Jo	912 7.8 L	949 8.0 Me	947 9.2 An	928 7.5 Ad
923 12.3 L	925[12.8 Gy	914 8.0 Pt	950 8.0 Pt	948 9.2 Me	932 7.9 Sz
940 10.6 L	928 13.1 Pt	916 8.0 Ko	951 8.0 Pt	949 9.0 Bc	939 7.9 L
940 10.5 Gt	933 13.3 Bw	918 7.9 Pt	952 8.1 Pt	951 9.2 Cy	939 8.3 An
944 10.3 Jo	942[13.1 Pt	918 8.0 Me	955 8.1 Pt	951 9.3 Pt	939 7.9 Be
947 10.2 Md	948 12.9 Gy	919 8.0 Me	956 8.0 Pt	956 9.0 Me	940 7.7 Jo
RZ Sco	951 12.7 Pt	919 7.9 Ko	956 8.0 Me	R Sco	942 8.0 Pt
155823	956 11.2 Gy	919 7.9 Pt	957 8.2 Me	*161122a*	948 7.6 Jo
864 11.7 En	U Ser	919 8.3 Jo	957 8.0 Pt	864[12.6 En	948 7.6 Si
881 10.8 Ht	160210	920 8.0 Me	958 8.1 Pt	887[12.6 Ht	952 7.5 Pt
881 10.7 En	887 9.5 Cy	920 8.2 Jo	960 8.0 Pt	895 14.7 Bk	U Her
887 10.4 Ht	894 9.5 We	922 8.0 Me	961 8.1 Pt	916[12.8 Pt	162119
888 10.3 En	899 10.6 Cy	923 8.0 Me	962 8.2 Pt	921 13.9 Bk	857 11.5 Ch
893 10.3 Ht	908 10.8 Cy	923 7.9 Pt	W Sco	951 12.8 Pt	887 11.7 Cy
909 10.0 Mp	909 11.0 Wd	923 7.9 L	*160519*	S Sco	898 12.0 Jo
910 9.9 En	912 11.4 Wd	923 8.1 Hu	896[13.8 Bl	*161122b*	899 12.0 Hi
914 10.2 Ht	913 11.0 Jo	924 7.8 Pt	922[14.9 Bk	864 11.0 En	900 11.9 Cy
916 10.2 Pt	913 10.9 Cy	924 8.0 Jo	RU Her	881 11.9 En	914 12.4 Cy
918 10.0 En	916 12.0 Pt	924 8.0 Me	160625	881 11.7 Ht	918 13.4 Pt
918 10.0 Ht	918 11.3 Cy	926 7.9 Pt	857 12.3 Ch	887 12.0 Ht	924 12.9 Bg
924 10.0 Mp	919 11.4 Jo	927 7.8 Pt	891 11.4 Ko	888 11.9 En	925 13.0 Cy
942 10.1 Pt	919 11.4 Hf	927 8.0 Me	893 11.9 L	893 12.4 Ht	929 13.1 Pt
951 10.0 Pt	919 11.4 Wd	928 8.4 Me	894 11.5 Ah	895 12.6 Bk	942 12.9 Pt
Z Sco	922 11.2 We	928 8.0 Pr	898 11.1 Ko	896 12.6 Bl	952 13.2 Pt
160021	923 11.8 Hu	928 7.9 Pt	900 11.5 Ah	921 13.8 Bk	Y Sco
864 10.5 En	924 11.8 Cy	929 7.9 Pt	906 10.6 Bg	951[12.6 Pt	*162310*
881 10.5 Ht	928 12.0 Cy	929 8.1 Me	911 10.6 Ko	W CrB	895 13.5 Bk
881 10.3 En	928 11.9 Pt	930 8.0 Me	912 10.0 L	161138	921 14.0 Bk
887 10.4 Ht	929 11.6 Ah	930 8.0 Pt	913 10.4 Cy	925 12.8 Bw	SS Her
888 10.3 En	929 11.6 Be	931 8.0 Pt	915 9.3 We	931 12.5 Bw	162807
893 10.4 Ht	929 11.6 Gt	931 7.7 L	916 10.4 Ah	942 12.4 Pt	857 9.8 Ch
895 10.0 L	940 12.5 Ma	932 8.0 Pt	916 10.2 Pt	952 12.0 Pt	887 11.6 Cy
896 10.0 Bl	942 12.6 Pt	932 8.0 Me	918 10.2 Me	956 11.9 Md	891 11.9 Bk
897 9.6 Jo	951 12.8 Pt	933 8.1 Pt	919 10.0 Ko	W Oph	892 11.9 Bk
903 9.5 Bl	X Sco	934 8.1 Pt	920 9.2 Jo	*161607*	894 12.0 Bk
910 9.9 En	*160221a*	934 8.4 Ko	923 9.9 Hu	893 13.3 Bk	895 11.9 Bk
913 9.4 Mp	893 11.8 L	937 8.0 Pt	923 9.8 L	895 13.2 L	895 12.0 L
914 9.3 Be	896 11.7 Bl	938 8.0 Pt	924 9.3 Pt	914 13.6 L	900 11.9 Cy
914 9.3 An	903 11.2 Bl	939 8.1 Pt	924 10.2 Cy	923 14.0 L	912 11.2 L
914 10.0 L	913 11.3 L	939 8.0 Ko	924 8.9 Jo	928 14.0 Bk	914 10.7 Cy
918 9.8 En	920 11.2 Bl	940 7.9 Pt	924 9.8 Me	942[12.5 Pt	916 9.9 Cy
918 9.5 Ht	923 11.3 L	940 8.0 Mn	925 9.6 Bw	950[12.7 Be	918 10.0 Pt
918 9.4 Be	943 11.8 L	941 8.1 Pt	930 9.4 Me	V Oph	920 9.5 Jo
918 9.5 An	SX Her	941 8.3 Jo	930 9.5 Ah	*162112*	921 9.9 Bk
920 9.3 Bl	160325	942 8.2 Pt	931 8.7 L	863 8.2 Ch	922 9.9 Bk
923 9.2 L	891 8.8 Ko	942 7.8 Be	932 9.2 Ah	893 7.4 Jo	923 9.4 L
923 9.5 Hu	893 8.7 L	942 8.0 Me	934 8.7 Ko	895 7.5 L	924 9.8 Cy
924 9.6 Mp	897 8.7 Ko	943 8.0 Me	940 9.1 Ah	901 7.4 Jo	924 9.5 Jo
943 9.6 An	900 8.4 Ko	943 8.0 Ko	940 8.6 Ma	913 7.4 Jo	924 9.5 Bg
943 9.4 L	902 8.2 Pt	943 8.1 Pt	940 9.0 Me	914 7.5 L	930 9.5 Th
950 9.4 Be	903 8.3 Pt	944 8.0 Pt	941 8.9 Si	916 7.5 Pt	931 9.3 L
950 9.7 An	906 8.0 Pt	944 8.2 Me	941 8.5 Jo	917 7.5 Jo	941 9.3 Jo
R Her	906 8.0 Bg	945 8.0 Pt	942 8.4 L	918 8.0 Sz	941 9.7 Si
160118	906 8.1 Ko	946 8.0 Pt	943 8.8 Ko	920 7.4 Jo	941 9.6 Sf
909[13.5 Bw	907 8.1 Pt	948 8.0 Pt	943 9.1 We	923 7.9 Hu	942 9.4 Be
913[12.0 Jo	908 8.0 Pt	948 8.2 Me	944 9.3 Cy	923 7.4 L	942 9.8 Si

VARIABLE STAR OBSERVATIONS RECEIVED DURING SEPTEMBER, 1932.

J.D.Est.Obs.	J.D.Est.Obs.	J.D.Est.Obs.	J.D.Est.Obs.	J.D.Est.Obs.	J.D.Est.Obs.
SS HER	W HER	R DRA	RR SCO	R OPH	α HER
162807	163137	163266	*165030a*	*170215*	171114
942 9.4 L	940 11.5 Ma	942 12.0 Pt	864 11.6 Sl	942 10.9 Pt	942 3.6 Si
942 9.3 Pt	941 11.1 El	945 12.0 Jo	865 12.1 En	944 10.5 Jo	944 3.4 Mc
942 9.3 Th	941 11.2 Jo	946 12.1 El	879 11.4 Sl	948 10.2 Jo	946 3.3 Mc
943 9.2 We	942 11.9 Pt	948 12.3 Jo	881 11.8 Ht	950 10.4 An	948 3.3 Si
944 9.0 Cy	943 11.1 El	950 12.2 El	881 11.5 En	950 10.1 Be	949 3.1 Mc
944 9.5 Jo	945 11.5 Jo	952 12.6 Pt	885 11.5 Sl	952 9.5 Pt	950 3.6 Si
945 9.8 Th	949 11.8 El	953 12.5 Gy	887 11.7 Ht	956 9.4 Gy	951 3.2 Mc
946 9.6 Sf	949 12.6 Ko	957 12.0 Me	888 11.4 En	RT HER	Z OPH
947 9.5 An	950 12.0 An	RR OPH	893 11.6 Ht	170627	171401
951 9.9 Cy	952 12.1 Pt	*164319*	896 11.3 Bl	857 11.8 Ch	843 8.3 Hl
952 9.8 Pt	955 12.0 El	864 10.8 En	903 10.0 Bl	893 9.2 Bc	893 7.9 Th
957 9.8 Sf	R UMi	881 11.0 En	910 10.4 En	893 9.4 Th	894 8.2 Ah
T OPH	163172	888 11.2 En	911 9.9 Sl	898 9.4 Th	898 8.0 Ah
162815	893 9.4 Jo	893 11.7 L	914 11.0 Ht	898 9.7 Ko	898 7.9 Th
863 11.8 Ch	898 9.4 Jo	910 11.8 En	918 9.9 En	906 9.8 Ko	899 7.9 Th
895 13.3 Bk	901 9.3 Jo	914 12.6 L	SS OPH	915 9.4 We	900 7.9 Th
895 12.8 L	908 8.8 Pr	918 12.3 En	*165202*	916 10.5 Ko	900 7.9 Ah
914 13.3 L	908 9.2 L	918 12.6 Pt	863 9.0 Ch	918 10.3 Pt	901 7.6 Jo
921 13.6 Bk	913 9.0 Jo	925 13.4 L	899 11.6 Hi	920 10.6 Jo	905 7.8 Pr
925 14.0 L	917 9.2 L	942 12.6 Pt	912 12.2 Md	923 10.8 Hu	908 7.7 Jo
952[12.0 Pt	919 9.2 Jo	S HER	918 12.2 Pt	924 10.4 Jo	911 8.0 Ah
S OPH	920 9.3 Jo	164715	952[12.5 Pt	924 10.6 Bg	912 8.4 Wd
162816	923 9.2 Bc	841 8.4 Ch	RV HER	928 11.1 Bw	913 7.8 Jo
863 11.8 Ch	924 9.6 Jo	894 11.0 Jo	165631	928 10.6 Pt	914 8.2 Ah
891 12.8 L	925 9.2 L	898 11.5 Jo	841 11.8 Ch	928 10.7 Jo	915 8.0 Ah
896 12.6 Bl	928 9.4 Jo	900 10.9 Ah	857 9.9 Ch	928 9.5 Th	918 8.0 Pt
913 14.0 L	939 9.6 L	906 11.1 Bg	908 11.3 L	939 11.3 Ko	919 8.4 Wd
925 14.1 L	939 9.5 An	914 12.0 Jo	913 10.6 Jo	939 11.4 Hi	919 8.0 Hf
W HER	939 9.6 Be	914 11.3 Ah	917 12.0 L	941 10.9 Jo	921 7.8 Jo
163137	940 9.9 Me	918 11.7 Pt	918 11.6 Pt	942 11.0 Th	922 8.2 Me
841 8.3 Ch	941 9.8 Jo	919 12.3 Jo	919 10.8 Jo	942 11.2 Pt	923 7.6 Pr
857 8.4 Ch	945 9.7 Jo	920 12.0 Jo	924 11.8 Jo	946 11.6 Jo	923 8.3 Hu
898 9.5 Th	948 9.8 Jo	923 12.1 Hu	925 12.2 L	949 12.2 Ko	924 8.2 Jo
898 9.2 Ko	949 9.8 Bc	924 12.2 Jo	928 12.3 Jo	952 11.8 Pt	928 7.7 Jo
901 9.2 Jo	952 9.0 Mc	924 11.8 Bg	926 11.8 Bw	961 12.7 Bw	928 7.7 Th
906 9.4 Ko	953 8.8 Mc	925 13.0 Bw	928 12.0 Pt	962 12.0 Wa	928 7.4 Pr
908 9.6 Jo	R DRA	928 12.0 Jo	931 12.1 Bw	RW SCO	929 7.9 Th
912 10.2 El	163266	929 11.9 Pt	931 12.3 L	*170833*	930 8.2 Th
912 10.0 Sf	849 8.8 Ch	933 12.3 Bw	942 12.4 Me	865[12.5 En	930 7.9 Pt
913 9.8 Jo	885 11.0 Ch	939 12.5 Jo	942 13.0 Pt	918 12.3 En	930 8.0 Ah
916 10.0 Pc	892 10.7 Mn	942 12.5 Pt	949 12.9 L	α HER	932 8.1 Ah
916 10.5 Ko	893 11.4 Jo	952 12.4 Pt	950 13.3 An	171114	940 8.3 Ah
917 9.8 Jo	896 11.0 Mn	RS SCO	952 13.5 Pt	890 3.3 Si	941 7.6 Jo
917 10.2 El	898 11.7 Jo	*164844*	RT SCO	891 3.3 Si	941 8.1 Wd
918 11.1 Sz	900 11.6 Ah	864 9.6 En	*165636*	894 3.2 Si	942 8.0 Pt
918 10.6 Pt	909 11.8 Wd	881 10.8 Ht	865[12.1 En	899 3.2 Si	942 8.3 Th
920 10.0 Jo	912 12.1 Wd	881 10.3 En	896[14.0 Bl	903 3.4 Si	944 8.3 Th
923 10.6 Hu	913 12.4 Jo	887 10.8 Ht	918[12.1 En	907 3.2 Si	945 8.2 Ah
924 10.4 El	916 12.2 Ah	888 10.4 En	R OPH	910 3.4 Mc	946 8.2 Ah
924 10.2 Jo	918 12.5 Pt	893 11.0 Ht	*170215*	911 3.3 Mc	946 8.3 Th
926 11.2 Bw	921 12.5 Jo	896 10.6 Bl	884 13.5 Ch	912 3.4 Mc	948 7.6 Jo
927 10.4 El	924 12.4 Hf	903 10.8 Bl	908 12.5 L	913 3.2 Si	952 8.0 Pt
928 11.1 Pt	924 12.4 Wd	910 11.1 En	917 11.9 L	915 3.3 Mc	960 8.2 Wd
930 10.6 El	928 12.2 Pt	914 11.2 Ht	918 11.8 Pt	916 3.2 Si	RS HER
933 11.3 Bw	928 12.3 Jo	918 11.3 Ht	927 11.4 L	922 3.4 Mc	171723
939 11.1 El	933 12.2 El	918 11.2 En	940 10.4 Gt	922 3.3 Si	894 8.9 Ah
939 10.9 Jo	941 12.0 Jo	920 11.2 Bl	940 10.5 L	925 3.3 Si	898 8.9 Ah
939 11.6 Ko	942 12.2 El		942 10.6 Me	941 3.2 Si	899 8.8 Ah

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J.D.Est.Obs.	J.D.Est.Obs.	J.D.Est.Obs.	J.D.Est.Obs.	J.D.Est.Obs.	J.D.Est.Obs.
RS HER	RU OPH	RT OPH	T HER	X DRA	W LYR
171723	172809	175111	180531	180666	181136
900 8.8 Ah	929 11.1 Be	918 10.8 Pt	895 11.0 Bc	895 14.2 Bk	924 8.9 Hf
901 8.2 Jo	929 11.1 Gt	921 11.0 Jo	897 11.5 Jo	916 12.0 L	924 8.8 Jo
902 8.7 Ah	930 11.0 Me	928 11.4 Pt	900 11.8 Ah	918 11.5 Pt	926 8.5 Jo
907 8.3 Ah	931 11.5 L	928 11.1 Bw	901 11.8 Jo	922 11.3 Br	928 8.7 Pt
908 7.9 Jo	932 11.2 An	930 11.1 Pt	908 12.4 L	922 12.2 Bk	929 8.6 Ah
910 8.4 Nd	938 11.8 Md	942 12.0 Pt	918 13.1 Pt	925 11.3 Jo	929 8.5 Me
913 8.0 Jo	942 11.8 Pt	945 11.7 Jo	922 12.8 Br	928 11.5 L	931 8.5 Ah
914 8.0 Ah	942 11.8 L	952 12.1 Pt	925 12.9 L	928 11.5 Pt	932 8.5 Ah
915 7.8 Md	943 11.9 An	961 12.3 Bw	926 11.5 Bc	928 11.3 Me	938 8.0 Md
916 8.0 Ah	948 12.0 Gy	RY HER	928 12.8 Pt	942 11.7 Gy	939 8.1 An
918 7.8 Pt	952 12.0 Pt	175519	931 12.9 El	942 11.5 Pt	939 8.1 Be
919 7.6 Jo	956 12.3 Gy	857 10.3 Ch	931 12.7 L	943 11.8 Md	939 7.9 Gt
920 7.8 Jo	962 12.4 Wa	908 13.2 L	940 12.6 El	949 12.0 L	940 8.3 Ah
924 7.5 Jo	RT SER	913 12.9 Mp	942 12.0 Pt	952 11.8 Pt	941 8.0 Jo
924 7.5 Md	*173411*	918 13.2 Pt	943 11.6 Me	956 11.3 Gy	941 8.3 Sf
928 7.8 Jo	893 12.8 L	924 13.4 Mp	943 12.1 El	958 11.2 Me	941 8.1 Wd
928 8.0 Pt	914 12.8 L	925 13.7 L	944 11.6 Jo	TV HER	942 7.8 Pt
930 7.9 Me	925 12.9 L	928 13.5 Bw	945 11.5 Ah	181031	943 8.1 Jo
930 7.8 Ah	RU SCO	928 13.2 Pt	946 11.2 Bc	918[14.1 L	943 8.3 Je
931 7.8 Ah	*173543*	942 13.4 L	946 11.2 Bf	927 14.1 L	944 8.3 Je
932 8.0 Ah	865 11.8 En	942 13.0 Pt	948 11.3 Jo	RY OPH	945 8.1 Je
933 7.9 Ah	882 11.2 En	952 13.2 Pt	949 11.4 L	181103	945 8.2 Ah
938 8.2 Md	888 10.6 En	961 13.1 Bw	949 11.5 El	865 8.4 Sl	945 8.2 Md
939 8.0 Hi	896 10.5 Bl	V DRA	952 10.8 Pt	881 10.6 Sl	946 8.1 Ah
940 8.1 Ah	903 10.3 Bl	175654	953 10.8 Gy	887 11.5 Sl	948 8.0 Jo
941 8.0 Jo	911 10.2 En	893 10.5 L	956 9.7 Gy	911 13.2 Sl	950 8.3 An
942 8.1 Pt	918 10.1 En	913 10.6 Mp	961 9.6 Wa	918 13.2 Pt	951 8.4 Hf
945 8.3 Ah	SV SCO	913 9.9 Md	962 9.2 Gy	929 13.1 Bw	951 8.1 Wd
946 8.2 Ah	*174135*	918 10.4 Pt	W DRA	930 13.1 Pt	952 8.0 Pt
946 7.9 Jo	868[12.2 En	918 10.4 L	180565	942 12.2 Pt	956 7.8 Md
947 8.7 Md	911[12.2 En	922 10.7 Md	885 9.5 Ch	952 9.9 Pt	957 7.8 Sf
952 8.1 Pt	W PAV	924 10.7 Mp	891 9.6 Bk	W LYR	957 7.6 Wd
953 8.8 Md	*174162*	924 10.3 Jo	893 9.1 L	181136	960 8.0 Wd
962 8.3 Wa	866 11.9 Sl	925 10.7 Sz	895 9.6 Bk	893 11.0 Jo	960 7.9 Sh
S OCT	867 12.1 En	928 10.6 L	913 9.3 Md	894 11.1 Ah	960 7.8 Hf
172486	881 12.5 Ht	928 11.1 Pt	916 9.6 L	897 10.7 Jo	RV SGR
862 12.6 En	882 12.5 En	933 11.1 Bw	918 10.3 Pt	900 9.8 Ah	*182133*
865 12.9 Sl	886 12.7 Sl	940 11.3 Gt	922 10.4 Bk	902 9.6 Ah	868 12.7 En
886 13.5 Sl	887 13.0 Ht	940 11.5 L	922 9.4 Md	907 9.6 Hf	882 12.8 En
896[13.0 Bl	888 12.6 En	942 11.5 Pt	922 10.2 Br	907 9.8 Sf	896 13.9 Bl
911[12.0 En	896 13.0 Bl	952 11.7 Pt	924 10.0 Gy	907 9.7 Wd	918[12.4 En
915[12.8 Ht	911[13.0 En	R PAV	925 9.9 Jo	909 9.9 Md	SV HER
RU OPH	918[13.0 Ht	*180363*	928 10.0 Pt	911 9.6 Ah	182224
172809	RS OPH	867 9.0 En	928 10.2 Me	912 9.5 Wd	895 14.3 Bk
863 11.6 Ch	*174406*	881 9.3 Ht	928 9.9 L	912 9.6 Sf	912 14.2 L
895 9.6 L	918 11.1 Pt	882 9.8 En	931 10.2 Gy	912 9.8 L	922 14.0 Bk
910 10.3 Md	942 11.2 Pt	887 10.0 Ht	942 11.5 Gy	913 9.0 Jo	925 14.2 L
912 10.0 L	952 11.1 Pt	888 10.2 En	942 11.0 Pt	914 9.1 Ah	942 13.0 Pt
915 10.5 Md	U ARA	893 10.2 Ht	943 11.5 Md	915 9.3 Md	949 12.8 El
918 9.7 Pt	*174551*	911 11.2 En	949 11.5 L	916 8.9 Ah	950 12.6 An
919 10.2 Gy	868[12.3 An	914 11.7 Ht	952 11.8 Pt	917 9.0 Jo	955 12.2 El
921 10.3 Jo	881[13.0 Ht	918 11.8 Ht	953 11.6 Gy	918 9.2 Sf	961 12.0 Wa
924 10.4 Gy	893[13.0 Ht	918 11.8 En	956 11.9 Gy	918 9.0 Pt	T SER
924 10.6 Md	911[12.3 En	T HER	958 12.0 Me	919 8.8 Wd	182306
925 11.3 L	918[12.3 En	180531	X DRA	919 8.9 Jo	885 10.4 Ch
925 10.5 Jo	RT OPH	857 8.4 Ch	180666	920 8.6 Jo	893 10.2 Jo
928 10.8 Pt	175111	891 11.0 Bc	891 14.4 Bk	923 9.0 Md	894 10.6 Jo
929 11.1 An	863 9.9 Ch	894 11.0 We	893 13.9 L	924 8.8 Wd	898 10.4 Jo

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J.D.Est.Obs.	J.D.Est.Obs.	J.D.Est.Obs.	J.D.Est.Obs.	J.D.Est.Obs.	J.D.Est.Obs.
T SER	X OPH	R SCT	R SCT	R SCT	R SCT
182306	183308	*184205*	*184205*	*184205*	*184205*
912 11.1 Jo	920 8.3 Jo	887 6.4 Cy	909 7.5 Bc	919 6.9 Mn	927 5.8 Mn
913 11.3 Mp	921 7.9 We	888 6.8 Cy	909 7.5 Bf	919 6.9 Wd	928 5.8 Ad
918 11.6 Pt	922 8.3 Mn	889 6.3 Mn	909 7.4 Me	919 6.1 Bc	928 5.9 Pr
919 11.8 Jo	923 7.8 Hu	890 6.5 Bc	909 7.1 Cy	919 6.5 Me	928 6.0 Sh
920 11.7 Jo	923 7.8 Si	890 6.4 Bf	910 7.3 We	919 6.7 Cy	928 5.7 Bg
924 11.6 Jo	924 8.6 Jo	890 6.3 Si	910 7.3 Mn	919 6.5 Ah	928 5.9 Wd
924 11.8 Mp	925 8.0 Si	891 6.6 Si	910 7.1 Bc	919 6.4 Ma	928 5.8 Me
928 12.0 Jo	927 8.4 L	891 6.5 Bf	910 7.1 Bf	920 6.5 Be	928 5.7 Ah
929 11.9 Bw	927 8.4 Mn	891 6.5 Bc	910 6.7 Mc	920 6.7 Pc	928 5.6 Be
930 11.7 Pt	928 8.6 Jo	891 6.4 Oy	910 7.3 Me	920 6.2 Gy	928 5.5 Bc
942 12.7 Pt	928 7.6 Ad	891 6.9 Cy	911 7.0 GD	920 6.3 Bc	928 5.5 Bf
955 12.7 Pt	930 8.0 Pt	893 6.2 Jo	911 7.0 Sl	920 6.4 Me	928 5.3 Cy
961 12.2 Wa	931 8.5 Ah	893 7.0 We	911 7.1 Bc	920 6.7 Cy	928 5.4 Jo
SV DRA	932 8.5 An	893 6.5 Bc	911 7.1 Bf	920 6.1 Ah	929 5.7 Bg
183149	934 8.4 Ko	893 6.4 L	911 7.1 Mc	920 6.1 Jo	929 5.8 Me
893 12.4 L	938 8.6 L	894 6.7 Bc	911 7.2 Cy	920 6.3 Ma	929 5.7 Ah
916 13.2 L	938 8.5 Be	895 6.7 Oy	912 6.9 Jo	921 6.1 Pr	929 5.8 An
928 13.5 L	938 8.4 Gt	895 6.7 Be	912 7.0 GD	921 6.2 We	929 5.4 Be
949 14.0 L	938 8.3 Si	895 6.6 Bc	912 7.2 Wd	922 6.6 Mc	929 5.5 Bc
RZ HER	940 8.6 Mn	896 6.9 Mn	912 7.1 Bc	922 6.2 Me	929 5.3 Cy
183225	941 8.5 Jo	896 6.7 Bc	912 7.1 Bf	922 6.1 Bc	929 5.0 Gt
895 14.5 Bk	941 8.5 Si	897 6.7 Bc	912 7.1 Mc	922 6.5 Mn	930 5.6 Bg
922 14.9 Bk	942 8.5 Si	897 6.7 Bf	912 7.3 Pt	922 6.5 Si	930 5.6 Me
X OPH	942 8.0 Pt	897 7.0 Cy	913 7.2 GD	923 6.1 Pr	930 5.6 Ah
183308	943 8.4 Ko	898 7.2 Cy	913 7.0 Be	923 6.1 GD	930 5.7 Bc
535 7.5 Hl	943 8.6 Me	898 6.7 Jo	913 7.2 Bc	923 6.1 Me	930 5.7 Bf
885 7.2 Ch	943 8.6 An	899 6.9 Bc	913 7.3 Si	923 6.0 Ah	930 5.3 Cy
890 8.0 Si	944 8.9 Rc	899 6.9 Bf	913 7.2 Me	923 6.0 Hu	931 5.6 Gy
891 7.9 Si	945 8.4 Mn	899 6.5 Si	913 7.0 Cy	923 6.1 Bc	931 5.5 Bg
892 7.9 Mn	945 8.8 Ah	899 7.2 Cy	913 7.0 Ma	923 6.0 Cy	931 5.6 Ah
893 7.8 We	946 8.7 Ah	900 7.2 Cy	914 7.1 We	923 6.8 Si	931 5.7 Bc
893 7.6 Jo	946 8.2 Si	901 6.9 Jo	914 7.4 Si	924 6.0 GD	931 5.0 L
894 7.6 Jo	948 8.1 Si	901 6.9 GD	914 7.1 Me	924 5.9 Hf	932 5.5 Ah
894 8.1 Ah	948 8.5 Jo	901 7.2 Cy	914 7.0 Cy	924 5.9 Gy	932 6.0 Hu
895 7.9 Si	950 8.5 Mn	902 7.1 Cy	914 7.1 Pt	924 6.0 Wd	932 5.9 An
896 7.9 Mn	955 8.6 Pt	902 6.9 Pt	915 7.2 Mn	924 6.0 Me	932 5.5 Bc
898 7.8 Jo	962 9.3 Rc	903 6.9 Bc	915 7.0 Mc	924 6.0 Ah	932 5.5 Bf
899 8.0 Si	RS DRA	903 6.9 Bf	915 7.1 Me	924 5.8 Be	932 5.5 Me
899 8.1 Ah	184074	903 7.4 Si	916 6.9 Pc	924 5.9 Cy	933 5.4 Bg
900 7.9 Ko	885 11.0 Ch	903 7.0 Cy	916 7.3 Si	924 5.8 Jo	933 5.5 Bc
901 8.2 Rc	RY LYR	903 7.1 Pt	916 7.0 Cy	925 6.0 GD	933 5.1 Cy
903 8.2 Si	184134	904 7.0 An	916 6.9 Ah	925 5.8 Bg	933 5.5 Pt
908 8.0 We	893 13.4 L	904 7.0 Be	917 6.8 Jo	925 6.0 Bf	934 5.5 Bc
908 8.3 L	895 14.3 Bk	904 7.0 Bc	917 7.0 Pc	925 5.9 Me	934 5.5 Bf
910 8.1 Mn	917 14.1 L	904 6.9 Bf	917 7.0 Wd	925 5.7 Hu	934 5.4 Ma
911 8.3 Ko	919 14.2 Lg	905 7.1 Bc	917 6.6 Bc	925 5.9 Bc	934 5.5 Pt
912 8.3 Jo	921 14.7 Bk	905 7.1 Bf	917 7.0 Cy	925 6.0 Bf	935 5.6 Bc
913 8.0 Si	955[12.5 Pt	906 7.1 Bc	917 6.6 L	925 5.7 Cy	935 5.6 Bf
914 8.2 Ah	R SCT	906 7.0 Pt	918 6.4 GD	925 5.5 L	935 5.8 Hf
915 8.3 Mn	*184205*	907 7.4 Hf	918 6.7 Bc	925 5.8 Si	935 5.5 Pt
916 8.2 Si	865 5.4 Sl	907 7.1 Je	918 6.7 Bf	926 5.9 Bg	935 5.9 Sh
917 8.5 Jo	870 5.8 Lg	907 7.1 Cy	918 6.9 Mc	926 5.8 Me	935 5.9 Wd
918 8.2 L	877 5.6 Lg	907 7.3 Wd	918 6.7 Me	926 5.8 Ah	936 5.6 Bc
918 8.2 Pt	881 5.8 Sl	907 7.0 Pt	918 6.9 Cy	926 5.9 Bc	936 5.4 Me
919 7.9 Me	881 6.1 Oy	908 7.5 Me	918 6.6 Ah	926 5.6 Cy	936 5.3 Si
919 8.5 Jo	883 6.2 Ch	908 7.2 Cy	918 6.4 Ma	927 5.8 Bg	937 5.7 Bc
919 8.3 Mn	885 6.6 Ch	908 7.2 Pt	919 7.0 Hf	927 5.9 Me	937 5.5 Bf
919 8.1 Ko	886 6.0 Sl	908 7.1 L	919 5.6 Lg	927 5.8 Ah	937 5.4 Bg

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J.D.Est.Obs.	J.D.Est.Obs.	J.D.Est.Obs.	J.D.Est.Obs.	J.D.Est.Obs.	J.D.Est.Obs.
R SCT	R SCT	RW LYR	S CRA	V AQL	R AQL
184205	*184205*	184243	*185437a*	*185905*	190108
937 5.1 Cy	946 5.2 Bc	919 11.4 Lg	865 12.3 Sl	896 7.9 Mn	943 5.6 Pt
937 5.3 Pt	946 5.2 Bf	Nov AQL	868 11.5 En	910 7.8 Mn	944 5.9 Si
938 5.3 Bg	946 5.2 Bg	184300	881 12.1 Sl	915 7.8 Mn	945 5.9 Ah
938 5.0 Gt	946 5.5 Jo	885 11.2 Ch	881 11.8 Ht	919 7.8 Mn	945 5.6 Mn
938 5.4 Pt	946 6.0 Mc	894 10.9 Jo	882 12.0 En	922 7.8 Mn	946 5.9 Ah
938 5.2 Si	946 5.6 Pt	908 11.0 Jo	885 12.1 Sl	927 7.8 Mn	948 6.0 Jo
938 5.8 We	946 4.7 Si	912 11.0 Jo	887 11.8 Ht	940 7.8 Mn	948 5.8 Si
939 5.5 Bc	948 5.7 Gy	912 11.7 Pt	896 11.7 Bl	945 7.7 Mn	950 5.6 Mn
939 5.2 Bg	948 5.2 Me	916 11.4 Pt	911 11.5 En	950 7.8 Mn	950 6.0 Si
939 5.0 Gt	948 5.8 Pt	918 10.5 Ma	911 11.9 Sl	R AQL	950 6.0 We
939 5.6 GD	948 4.8 Si	920 10.7 Jo	919 12.1 En	190108	952 6.6 Rc
939 5.8 Je	949 5.7 An	924 11.0 Jo	ST SGR	885 7.5 Ch	955 6.0 Pt
939 5.3 Me	949 5.2 Bc	928 10.8 Jo	*185512a*	892 7.6 Mn	961 6.7 Rc
939 5.5 Pt	949 5.2 Cy	928 11.6 Pt	922 13.8 Bk	893 7.5 Jo	V LYR
939 5.1 Si	949 5.2 L	930 11.6 Pt	949 12.1 L	893 7.7 Ah	190529a
940 5.8 An	949 5.8 Mc	937 11.6 Pt	R CRA	894 7.7 Ah	918 10.6 Pt
940 5.3 Bc	949 5.3 Me	943 11.6 Pt	*185537a*	895 7.3 Jo	919 11.2 Lg
940 5.2 Bg	950 5.4 Bc	948 11.3 Jo	865 12.7 Sl	896 7.5 Mn	922 11.1 Br
940 5.3 Cy	950 5.6 An	952 11.5 Pt	868 12.5 En	898 7.0 Ko	928 10.6 Pt
940 5.1 Gt	950 5.0 Bc	958 11.6 Pt	881 12.5 Ht	899 7.4 Ah	943 10.6 Pt
940 5.3 Me	950 5.0 Bf	RX LYR	881 13.0 Sl	900 7.4 Ah	945 11.0 Md
940 5.8 Mn	950 5.3 Me	185032	882 13.5 En	901 6.8 Jo	956 11.1 Md
940 5.6 Pt	950 5.8 Mn	922 15.0 Bk	885 13.3 Sl	901 7.3 Rc	RX SGR
940 5.0 Si	950 5.6 Pt	925 15.0 L	887 12.5 Ht	902 7.2 Ah	*190818*
941 5.4 Pt	951 5.0 Bc	949 13.0 L	896 11.9 Bl	906 6.4 Ko	868 12.0 En
941 5.2 Jo	951 5.0 Bf	955 13.1 Pt	911 11.9 En	907 6.4 Ah	893 12.8 L
941 4.8 Si	951 5.7 Hf	957 12.8 Me	911 11.4 Sl	910 5.9 Mn	914 13.1 L
941 5.6 Wd	951 5.9 Mc	R LYR	919 11.9 En	911 6.1 Ah	925 12.5 Jo
942 5.8 An	951 5.7 Pt	185243	T CRA	912 6.0 El	943 12.4 Pt
942 5.2 Bc	951 5.6 Wd	890 4.3 Si	*185537b*	913 6.3 Jo	RW SGR
942 5.2 Bf	952 5.3 Cy	891 4.6 Si	865 13.2 Sl	914 6.1 Ah	*190819a*
942 5.5 Gy	952 5.8 Mc	894 4.2 Si	881 13.0 Sl	915 6.0 Ah	868 9.5 En
942 6.6 GD	952 5.2 Me	895 4.2 Si	881 12.5 Ht	915 5.6 Mn	882 9.9 En
942 5.3 Me	952 5.6 Pt	899 4.3 Si	885 13.0 Sl	916 6.2 Pc	884 9.8 Ch
942 5.6 Pt	953 5.7 Gy	903 4.3 Si	887 12.5 Ht	916 6.0 Ko	887 9.8 Ht
942 5.0 Si	953 5.6 Mc	907 4.2 Si	896 13.0 Bl	916 5.9 Ah	893 9.7 L
943 5.7 An	953 5.3 Me	910 4.4 Mc	911 12.9 Sl	916 5.9 Rc	911 10.3 En
943 5.4 Bc	954 5.4 Me	911 4.2 Mc	919 12.5 En	918 5.9 Pt	912 10.2 L
943 5.2 Bf	955 5.5 GD	912 4.3 Mc	Z LYR	919 5.6 Jo	918 10.3 En
943 5.2 Bg	955 5.5 Pt	913 4.3 Si	185634	919 5.7 Mn	918 10.1 Pt
943 5.8 Je	956 5.8 Gy	915 4.1 Mc	857 12.3 Ch	921 5.5 Jo	919 10.0 Ma
943 5.2 Be	956 5.5 Me	916 4.6 Si	893 14.0 L	922 5.6 Mn	920 10.6 Pt
943 5.3 Me	956 5.4 Pt	918 4.3 Mc	917 14.5 L	924 5.5 Jo	925 10.9 Jo
943 5.5 Pt	957 5.4 Me	922 4.3 Mc	919 13.4 Lg	927 5.6 Mn	925 10.2 L
943 5.2 We	957 5.4 Pt	922 4.5 Si	955 13.0 Pt	928 5.6 Pt	931 10.4 L
944 5.5 An	958 5.2 Bg	924 4.3 Si	SU SGR	929 5.5 Ah	943 11.0 Pt
944 5.4 Bc	958 5.4 Pt	925 4.2 Si	*185722*	930 5.7 Ah	955 10.9 Pt
944 5.2 Bf	959 5.4 Bg	936 4.3 Si	887 8.4 Ht	931 5.7 Ah	BH SGR
944 5.3 Cy	959 5.3 Me	941 4.1 Si	RT LYR	932 5.7 Ah	*190819b*
944 6.2 Mc	959 5.5 Pt	942 4.1 Si	185737	933 5.7 Ah	893 12.1 L
944 5.2 Me	960 5.3 Bg	944 4.9 Mc	895 14.9 Bk	934 5.7 Ko	914 12.1 L
944 5.4 Pt	960 5.5 Hf	946 4.6 Mc	919 11.2 Lg	940 5.6 Mn	925 12.1 L
944 5.0 Si	960 5.4 Pt	948 4.1 Si	922 14.8 Bk	940 5.8 Ah	TY AQL
944 5.5 Wd	961 5.7 Wd	949 4.4 Mc	949 13.8 El	941 6.4 Jo	*190907*
945 5.3 Hf	962 5.4 Bg	950 4.1 Si	955 13.7 El	941 5.9 Si	918 10.2 Me
945 5.4 Pt	962 5.4 Pt	952 4.5 Mc	V AQL	942 5.9 Si	918 10.4 Pt
945 5.7 Mn	964 5.4 Bg		*185905*	942 5.6 Rc	919 10.5 Me
946 5.6 An			889 7.7 Mn	943 5.9 Ko	920 10.3 Me

VARIABLE STAR OBSERVATIONS RECEIVED DURING SEPTEMBER, 1932.

J.D.Est.Obs.	J.D.Est.Obs.	J.D.Est.Obs.	J.D.Est.Obs.	J.D.Est.Obs.	J.D.Est.Obs.
TY AQL	U DRA	R SGR	RY SGR	TZ CYG	RT AQL
190907	190967	*191019*	*191033*	191350	193311
922 10.2 Me	928 10.2 Pt	946 8.2 Si	939 7.3 Be	918 10.1 Pt	943 11.0 Pt
923 10.2 Me	928 9.9 L	946 9.1 El	939 7.3 An	928 10.6 Pt	945 10.9 Ah
924 10.3 Me	939 10.5 Sf	948 8.2 Si	939 7.4 L	943 11.0 Pt	955 11.5 Pt
925 10.3 Me	943 10.6 Pt	949 8.8 Me	939 7.3 Gt	955 11.2 Pt	961 11.0 Wa
927 10.2 Me	944 10.9 Sf	955 8.0 Pt	940 6.5 Pt	U LYR	R CYG
928 10.3 Me	955 11.1 Pt	RY SGR	941 6.6 Pt	191637	193449
928 10.5 Pt	957 11.3 Br	*191033*	942 6.6 Pt	893 11.5 Jo	913 13.1 Pc
929 10.4 Me	W AQL	863 7.1 En	943 7.4 L	913 10.9 Jo	918 12.5 Ma
942 10.2 Me	*191007*	865 6.5 Sl	943 7.4 An	918 10.5 Pt	920 12.8 Pt
943 10.1 Me	893 9.2 L	868 6.9 En	944 6.6 Pt	919 10.8 Jo	928 12.3 Wd
943 10.3 Pt	914 9.8 L	874 6.8 En	945 6.5 Pt	919 10.8 Lg	928 11.8 Jo
944 10.2 Me	918 10.2 Pt	880 6.9 En	946 6.7 Pt	920 10.8 Jo	929 12.1 Pt
948 10.2 Me	918 9.9 Me	880 6.9 Sl	946 7.3 L	924 11.0 Jo	932 11.9 Wd
949 10.1 Me	925 10.2 L	881 7.1 Ht	946 7.4 An	928 11.0 Jo	935 11.4 Wd
955 10.5 Pt	928 10.2 Pt	885 6.7 Sl	946 7.3 Be	928 10.8 Pt	935 11.3 Hf
956 10.2 Me	942 10.3 Me	885 7.5 Ch	948 6.8 Pt	943 10.5 Pt	938 11.2 El
957 10.1 Me	943 10.6 Pt	887 7.4 Ht	950 6.9 Pt	943 10.0 Jo	939 10.2 Jo
S LYR	955 11.0 Pt	888 6.8 En	951 7.0 Pt	948 10.0 Jo	940 11.0 El
190925	956 10.8 Me	893 6.8 L	952 7.5 Pt	955 10.8 Pt	941 10.9 Wd
893 14.2 L	T SGR	896 6.8 Bl	956 7.4 Pt	AF CYG	941 11.1 El
895 14.2 Bk	*191017*	897 6.5 En	957 7.1 Pt	192745	942 11.0 Gy
914 14.4 L	884 11.9 Ch	900 7.0 Bl	958 7.5 Pt	894 7.3 Ah	943 10.0 El
922 14.6 Bk	913 12.2 Pc	904 6.9 Bl	962 7.0 Pt	899 7.2 Ah	943 10.0 Me
943[12.9 Pt	918 11.7 Pt	906 6.7 Pt	TY SGR	900 7.5 Ah	943 10.6 Pt
955[12.9 Pt	923 11.7 Hu	908 6.8 Pt	*191124*	907 7.6 Ah	943 9.7 Jo
X LYR	928 12.6 Pt	908 7.3 L	882[12.4 En	914 7.8 Ah	946 9.8 Jo
190926	942 12.6 El	908 6.5 En	900[12.4 Bl	916 7.7 Ah	946 10.2 El
918 8.8 Pt	943 12.0 Pt	911 7.0 En	S SGR	929 7.4 Ah	946 10.5 Ah
928 9.2 Pt	946 12.5 El	911 6.9 Sl	*191319a*	931 7.4 Ah	949 10.4 El
943 9.0 Pt	955 12.0 Pt	912 7.3 L	868 11.5 En	932 7.4 Ah	951 10.1 Hf
955 9.1 Pt	R SGR	912 6.9 Pt	882 11.4 En	940 7.2 Ah	951 10.1 Wd
RS LYR	*191019*	913 7.4 Pc	884 10.9 Ch	945 7.5 Ah	956 9.9 Pt
190933a	884 12.0 Ch	914 7.0 Pt	887 10.9 Ht	946 7.4 Ah	956 9.9 Gy
893 14.3 L	891 11.5 Bk	914 7.0 En	891 11.0 Bk	TY CYG	961 9.8 Wd
914 13.7 L	893 12.1 L	916 7.1 Pt	900 10.9 Bl	192928	962 9.9 Gy
919 13.6 Lg	902 11.2 Ko	918 7.0 Pt	904 11.0 Bl	884 11.9 Ch	RV AQL
922 13.5 Br	911 10.9 En	918 7.4 L	908 11.6 L	893 12.2 L	193509
925 13.1 L	912 11.1 Ko	918 6.9 En	911 11.4 En	914 13.0 L	908 9.8 L
943 12.5 Pt	913 10.7 Pc	919 6.9 Pt	913 11.6 Pc	918 13.3 Pt	918 10.2 L
953 11.9 Gy	914 11.1 L	920 7.1 Pt	918 11.8 En	923 13.0 Br	920 11.2 Pt
955 12.1 Pt	918 11.0 Pt	920 6.8 En	918 11.6 L	927 13.5 L	927 10.9 L
956 11.8 Gy	918 10.6 En	923 7.3 L	918 11.8 Pt	928 13.2 Pt	928 11.1 Me
957 12.0 Br	918 11.0 Me	923 7.0 Pt	918 11.8 Me	957 13.8 Br	929 11.2 Pt
RU LYR	919 11.0 Ko	924 6.6 Pt	923 11.6 Hu	RT AQL	939 11.7 L
190941	921 10.5 Bk	925 7.3 L	927 12.1 L	193311	943 11.7 Pt
891 15.0 Bk	923 10.0 Je	927 6.6 Pt	943 13.6 Pt	884 9.0 Ch	943 11.5 Br
895 14.7 Bk	925 10.9 L	928 6.5 Pt	Z SGR	894 9.6 Ah	956 12.2 Pt
922 15.0 Bk	926 10.5 Me	929 6.6 Pt	*191321*	899 9.8 Ah	T PAV
943[13.8 Pt	930 10.0 Pt	931 7.4 L	895 14.8 Bk	908 9.4 L	*193972*
957[13.8 Br	938 9.5 Be	933 6.6 Pt	922 14.6 Bk	914 10.3 Ah	866 12.9 Sl
U DRA	938 9.4 Gt	934 6.5 Pt	927 14.7 L	918 10.0 Pt	900 13.5 Bl
190967	938 9.5 L	935 6.5 Pt	SW SGR	918 9.7 L	911 12.1 En
885 9.8 Ch	939 10.0 Je	936 7.3 Be	*191331*	918 9.7 Ma	919 11.6 En
908 9.3 L	939 9.5 Ko	936 7.3 An	900[12.9 Bl	927 10.3 L	RT CYG
912 9.6 Sf	940 9.4 Me	936 7.3 L	919[12.1 En	928 10.2 Pt	194048
917 9.5 L	940 9.5 Je	937 6.5 Pt		931 10.5 Ah	884 6.7 Ch
918 10.0 Pt	942 9.5 El	938 6.5 Pt		939 10.8 L	892 7.0 We
925 10.1 Me	943 9.0 Pt	939 6.5 Pt		943 10.9 Br	893 7.0 Jo

VARIABLE STAR OBSERVATIONS RECEIVED DURING SEPTEMBER, 1932.

J.D.	Est.	Obs.	J.D.	Est.	Obs.	J.D.	Est.	Obs.	J.D.	Est.	Obs.	J.D.	Est.	Obs.	J.D.	Est.	Obs.
RT Cyg			**TU Cyg**			**X Aql**			**χ Cyg**			**Z Cyg**			**S Aql**		
194048			194348			194604			194632			195849			200715a		
893	7.2	Ah	891	14.4	Bk	943	9.3	Pt	961	9.8	Wd	924	8.9	Jo	893	9.5	Jo
894	7.2	Ah	895	14.5	Bk	944	9.6	Mc	962	9.7	Gy	924	9.9	Pt	895	9.6	Jo
895	7.2	Jo	912	13.2	L	945	9.5	Th	**S Pav**			924	10.0	Mc	898	9.8	Ah
899	7.1	Ah	918	12.4	Ma	945	9.2	Ah	*194659*			926	9.5	Mp	901	10.3	Jo
900	7.1	Ah	919	12.4	Ry	946	9.1	Ah	859	7.2	En	926	10.3	Br	908	10.3	Jo
901	6.8	Jo	920	12.3	Pt	946	9.4	Mc	865	6.5	Sl	927	9.8	L	909	9.9	Bg
907	7.0	Wd	921	12.3	Bk	946	9.5	Jo	885	7.4	En	928	9.0	Jo	912	10.6	Jo
907	7.2	Hf	923	12.1	Br	948	9.5	Me	886	6.5	Sl	930	10.0	Pt	913	10.1	Bg
907	7.2	Ah	924	12.2	Ry	949	9.2	Mc	914	7.5	En	939	11.0	Jo	914	10.9	Ah
908	6.7	Jo	927	12.2	L	951	9.1	Mc	919	7.6	En	943	10.5	L	917	11.0	Jo
910	7.3	Mc	928	11.9	Ry	952	9.1	Mc	**RR Sgr**			943	11.0	Pt	918	10.7	Bg
912	7.5	Mc	929	11.6	Pt	956	9.0	Pt	*194929*			946	11.5	Jo	918	11.1	Me
912	6.7	Jo	931	11.9	Ry	957	9.1	Sf	885	12.2	En	956	12.2	Pt	921	10.8	Jo
914	7.3	Ah	933	11.6	Ry	**χ Cyg**			900	13.5	Bl	**S Tel**			922	11.3	An
915	7.7	Mc	939	11.5	Ry	194632			919	12.2	En	*195855*			923	11.4	Bg
916	7.3	Ah	939	12.3	Jo	884	12.7	Ch	**RU Sgr**			866	13.0	Sl	924	11.3	Me
917	7.2	Jo	943	11.7	Jo	899	11.8	Ah	*195142*			887	12.6	Ht	924	11.6	Pt
918	7.8	Mc	943	11.5	L	909	11.9	Wd	859	12.9	En	919	12.6	En	924	11.0	Jo
919	7.5	Wd	943	10.9	Me	909	11.4	Bg	887	13.2	Ht	**SY Aql**			928	11.5	Jo
919	7.5	Hf	943	11.0	Pt	912	11.4	Wd	900	13.2	Bl	200212			930	11.7	Pt
920	7.3	Gy	943	11.2	Ry	913	11.2	Pe	919	12.8	En	891	14.8	Bk	931	11.6	Ah
920	7.2	Pt	946	11.5	Jo	916	11.2	Ah	**RR Aql**			916	14.6	L	939	11.7	Jo
920	7.3	Jo	956	10.4	Pt	918	11.4	Me	*195202*			921	14.5	Bk	943	12.0	Me
922	8.0	Mc	957	10.2	Br	918	10.9	Bg	912	13.3	L	922	14.0	Br	943	11.5	Pt
923	7.6	We	957	10.7	Ry	919	11.3	Wd	925	13.7	L	928	13.5	L	944	11.7	An
924	7.1	Jo	960	10.2	Ry	919	11.1	Ma	943	13.5	Br	943	12.8	L	944	11.8	Be
924	7.6	Gy	**X Aql**			919	11.4	Hf	**RS Aql**			943	13.1	Pt	945	11.8	Ah
924	7.8	Wd	194604			919	10.9	Gy	*195308*			943	12.8	An	946	12.0	Jo
924	7.7	Hf	893	12.4	L	920	11.3	Gy	912	14.2	L	953	12.2	Br	956	12.0	Pt
928	7.5	Jo	894	11.5	Ah	920	10.5	Jo	925	13.6	L	956	11.2	Pt	**RW Aql**		
929	7.8	Pt	900	11.5	Ah	923	10.9	Bg	**Nov Cyg**			961	10.5	Wa	200715b		
929	7.8	Ah	912	10.8	Mc	924	10.8	Bg	195553			**S Cyg**			893	9.3	Jo
931	8.1	Ah	912	11.2	Sf	924	11.2	Wd	884	13.2	Ch	200357			895	9.6	Jo
931	7.0	Gy	913	11.0	Jo	924	11.4	Pt	916	12.2	Pt	891	14.2	Bk	901	9.2	Jo
932	8.1	Ah	913	10.9	Pc	924	10.7	Jo	930	12.2	Pt	922	12.5	Br	908	9.5	Jo
938	8.2	El	914	11.4	L	924	11.3	Hf	952	12.2	Pt	922	12.0	Bk	909	9.4	Bg
939	7.7	Jo	915	10.7	Mc	924	11.2	Gy	**RR Tel**			924	12.0	Pt	912	9.5	Jo
940	8.4	Ah	916	11.0	Ah	926	10.3	Br	*195656*			930	12.0	Pt	913	9.1	Bg
941	7.9	Wd	918	11.0	Mc	928	10.8	Jo	866	13.5	Sl	938	12.0	El	917	9.7	Jo
941	8.5	El	918	10.7	Sf	929	11.2	Pt	887	12.6	Ht	942	11.8	El	918	9.2	Bg
942	8.6	Gy	919	11.5	Jo	930	10.9	Ah	919	12.6	En	943	11.8	Pt	921	9.5	Jo
943	8.5	El	920	10.6	Jo	931	10.9	Gy	**Z Cyg**			950	12.4	El	923	9.1	Bg
943	8.0	Jo	922	10.9	Mc	932	11.0	Me	195849			953	11.5	Br	924	9.3	Pt
943	8.7	Me	924	10.2	Pt	938	10.7	El	884	8.9	Ch	956	11.6	Pt	924	9.5	Jo
943	8.6	Pt	925	10.8	L	939	10.6	Jo	893	8.6	Jo	**R Cap**			928	9.4	Jo
944	8.9	Mc	926	10.2	Jo	939	10.0	Si	893	8.8	Th	*200514*			930	9.2	Pt
945	8.6	Ah	928	9.9	Th	941	9.9	Si	895	8.6	Jo	912	11.8	L	939	9.5	Jo
946	8.7	Ah	929	10.0	Pt	941	11.0	Wd	899	8.7	Th	924	11.4	Pt	943	9.2	Pt
946	8.3	Jo	930	10.0	Th	942	10.8	El	901	8.7	Jo	927	11.4	L	946	10.2	Jo
946	9.0	Mc	931	10.2	Ah	942	10.8	Gy	908	8.8	Jo	930	11.0	Pt	956	9.2	Pt
949	9.4	Mc	936	9.4	L	942	9.8	Si	908	8.8	L	943	11.0	Jo	**R Tel**		
953	9.5	Mc	936	9.3	An	943	10.4	Pt	912	8.7	Jo	943	11.2	Pt	*200747*		
956	9.0	Pt	936	9.4	Be	945	10.5	Ah	916	9.5	We	946	10.5	Jo	900	12.7	Bl
956	9.5	Gy	939	9.3	Hi	946	10.6	Bg	917	9.0	Jo	956	11.1	Pt	914	12.1	En
961	9.5	Wd	940	9.7	Ah	946	10.5	Jo	918	9.3	L	**S Aql**			919	12.4	En
962	9.9	Gy	941	9.6	Sf	949	10.4	El	920	9.5	Jo	200715a			**RU Aql**		
			942	9.7	Th	956	9.8	Pt	921	9.6	We	885	9.5	Ch	200812		
			943	9.4	Br	956	10.2	Gy							893	13.1	L

VARIABLE STAR OBSERVATIONS RECEIVED DURING SEPTEMBER, 1932.

J.D.Est.Obs.	J.D.Est.Obs.	J.D.Est.Obs.	J.D.Est.Obs.	J.D.Est.Obs.	J.D.Est.Obs.
RU AQL	RS CYG	R DEL	SX CYG	WX CYG	U CYG
200812	200938	201008	201130	201437b	201647
916 14.0 L	909 8.2 Cy	901 9.7 Jo	903 11.6 Cy	957 9.2 Pt	913 7.9 Bc
922 14.0 Br	911 8.3 GD	908 9.6 Jo	916 12.2 Cy	V SGE	914 8.0 Je
928 14.3 L	911 7.4 Ah	908 9.8 L	923 12.6 Cy	201520	914 9.0 We
W CAP	912 7.6 Jo	911 9.7 Ko	924 12.6 Pt	903 11.5 Bg	915 9.5 Mn
200822	912 8.2 GD	911 9.8 Ah	926 12.0 Br	910 10.9 Bg	915 8.2 Md
900[12.8 Bl	912 8.2 Wd	912 9.7 Sf	930 12.7 Pt	918 11.8 Me	915 9.2 Mc
943 13.2 Pt	913 7.5 Bc	913 9.3 Jo	930 12.8 Cy	919 11.5 Me	916 9.0 Si
956[12.5 Pt	913 8.4 Si	916 9.5 We	943 12.6 Pt	920 11.5 Me	916 8.8 Ah
Z AQL	914 7.2 Je	916 9.6 Cy	955 12.9 Br	922 11.0 Me	917 8.6 Jo
200906	014 7.6 We	916 9.7 Ah	956 13.0 Pt	923 11.3 Bg	918 9.3 Mc
914 10.0 Jo	916 8.4 Si	917 9.2 Jo	RT SGR	924 11.3 Me	919 9.3 Hf
922 11.3 An	916 7.5 Ah	918 9.3 L	*201139*	925 11.3 Me	919 9.5 Mn
924 10.2 Pt	916 8.3 Cy	918 9.4 Sf	900 11.0 Bl	926 11.2 Br	919 9.6 Wd
925 10.5 Bw	917 7.5 Jo	919 8.9 Jo	904 11.0 Bl	927 11.0 Me	920 8.6 Jo
926 10.0 Jo	918 7.8 GD	919 9.1 Ko	920 12.1 En	928 11.3 Me	921 8.2 Je
930 10.5 Pt	918 7.7 L	922 9.0 Br	WX CYG	929 11.4 Me	922 7.8 GD
931 10.4 Bw	919 8.3 Hf	924 9.0 Pt	201437b	930 11.3 Me	922 9.3 Mc
943 10.8 Pt	919 8.3 Wd	924 8.9 Cy	884 10.8 Ch	931 10.8 Me	923 9.0 We
950 11.3 An	920 8.4 Jo	924 8.7 Jo	890 10.5 Cy	940 11.6 Me	924 9.3 Hf
956 11.8 Pt	921 7.4 Je	928 8.6 Jo	893 10.3 Jo	942 12.0 Me	924 9.2 Wd
R SGE	923 8.6 Cy	928 8.9 L	895 10.4 Jo	943 12.2 Me	924 8.5 Pt
200916	923 8.2 GD	930 9.0 Th	897 10.7 Cy	944 11.9 Me	924 8.6 Jo
893 9.2 Jo	924 7.4 Pt	930 8.5 Pt	899 10.7 Ah	948 10.8 Me	927 9.6 Mn
895 9.6 Jo	924 8.2 Si	930 9.1 Ah	901 10.0 Jo	949 10.2 Me	928 8.7 Jo
901 9.4 Jo	924 7.6 Jo	932 9.0 Ah	907 10.4 Cy	950 10.0 Me	928 7.2 Ad
908 9.4 Jo	924 8.3 Hf	934 8.7 Ko	908 9.8 Jo	956 11.8 Me	929 9.4 Ah
912 9.6 Jo	924 8.3 Wd	940 8.7 Ah	908 10.4 L	957 12.1 Me	930 8.7 Pt
917 9.9 Jo	925 8.6 Si	941 8.4 Cy	911 10.4 Ah	958 11.8 Me	932 9.4 Ah
918 9.8 Mc	925 8.6 Si	941 8.5 Jo	912 9.6 Jo	959 11.9 Me	938 8.8 Md
921 9.6 Jo	927 7.8 L	941 8.6 Sf	912 10.6 Md	U CYG	939 10.0 Sf
924 9.5 Jo	928 7.6 Jo	942 8.9 Th	913 10.3 Cy	201647	939 8.7 Jo
924 9.7 Me	928 7.5 Ad	943 8.4 Ko	916 10.4 Ah	884 8.4 Ch	941 9.3 Wd
928 9.4 Jo	930 7.4 Pt	943 8.8 Pt	917 9.6 Jo	890 8.8 Si	941 8.5 Si
939 9.0 Jo	930 8.5 Cy	944 9.1 Mc	918 9.5 L	892 9.1 Mn	942 9.0 Si
943 9.4 Mc	931 7.5 Ah	944 9.0 Je	919 10.3 Cy	893 8.0 Jo	942 8.0 GD
946 9.2 Jo	938 8.8 Si	945 8.8 Th	920 9.5 Jo	895 8.2 Jo	943 9.0 Pt
RS CYG	939 8.9 Si	945 8.9 Ah	922 10.4 Md	895 9.1 Si	944 9.5 Mc
200938	939 7.6 Bc	946 8.8 Ah	923 10.4 Cy	896 9.1 Mn	945 10.2 Ah
880 7.8 Ch	939 7.6 GD	946 8.9 Mc	924 9.3 Jo	899 8.8 Ah	946 9.0 Jo
885 7.4 Ch	939 7.7 Jo	946 8.6 El	924 10.3 Pt	901 7.9 Jo	946 9.6 Mc
890 8.3 Cy	941 8.8 Si	948 8.5 Jo	925 10.7 Me	901 7.6 GD	949 9.5 Mc
890 8.0 Si	941 8.3 Wd	948 8.8 Th	927 9.0 L	902 9.0 Ah	949 9.5 Me
891 8.1 Si	942 8.6 Si	949 8.7 Mc	928 9.0 Jo	903 9.0 Si	949 7.8 GD
893 7.5 Jo	943 8.2 Mc	949 8.6 Cy	930 9.3 Pt	907 8.7 Wd	951 9.6 Mc
894 8.2 Si	943 7.7 Pt	950 8.5 El	930 10.4 Cy	907 8.8 Hf	953 9.7 Mc
895 7.4 Jo	943 7.8 L	955 8.7 El	931 10.2 Ah	907 7.8 Je	953 9.7 Md
895 8.0 Si	945 7.7 Jo	956 8.9 Pt	939 10.3 Cy	908 8.2 Jo	957 8.8 Pt
897 8.2 Cy	945 8.7 Hf	957 8.7 Sf	939 9.0 Jo	908 9.3 Mn	961 9.9 Wd
899 7.3 Ah	946 7.5 Ah	RT CAP	939 9.6 Si	909 8.6 Md	U MIC
899 8.0 Si	955 8.4 GD	*201121*	940 10.7 Md	910 9.0 Mc	*202240*
901 7.4 Jo	956 7.7 Pt	924 6.5 Pt	941 9.5 Si	911 9.1 Mc	900 12.3 Bl
902 8.2 Cy	961 8.8 Wd	943 6.7 Pt	942 9.6 Si	912 9.2 Mc	RU CAP
903 8.0 Si	R DEL	956 7.0 Pt	943 10.3 L	912 8.5 Jo	*202622*
907 8.1 Hf	201008	SX CYG	943 9.7 Pt	912 9.5 Sf	920[12.0 En
907 7.2 Je	894 10.6 Ah	201130	946 9.0 Jo	912 8.0 GD	Z DEL
907 8.2 Wd	897 10.7 Ko	884 11.2 Ch	946 9.8 Ah	912 9.2 Wd	202817
908 7.6 Jo	899 10.4 Cy	891 11.1 Cy	949 10.3 Cy	912 9.5 Mn	912 14.2 L
908 7.6 L	900 10.4 Ah	897 11.6 Cy	954 10.6 Md	913 7.9 GD	928 14.4 L

VARIABLE STAR OBSERVATIONS RECEIVED DURING SEPTEMBER, 1932.

J.D.Est.Obs. J.D.Est.Obs. J.D.Est.Obs. J.D.Est.Obs. J.D.Est.Obs. J.D.Est.Obs.

Z DEL
202817
930[12.9 Pt
943[12.9 Pt
953[13.6 Br
961[11.6 Wa
ST CYG
202954
884 12.3 Ch
912 12.9 L
924 13.0 Pt
927 12.9 L
930 12.6 Pt
943 13.0 Br
943 13.5 Pt
957 13.4 Pt
V VUL
203226
924 8.6 Pt
930 8.8 Pt
943 9.2 Pt
957 8.6 Pt
R MIC
203420
900 13.2 Bl
920 11.2 En
928 10.5 Me
Y DEL
203611
912 13.4 L
914 10.7 Jo
917 10.7 Jo
919 10.6 Jo
926 14.0 Br
928 13.6 L
953 14.0 Br
S DEL
203816
894 11.9 Md
915 10.4 Md
918 10.1 Bg
921 10.5 Jo
923 10.1 Md
923 10.5 Hu
924 11.0 Pt
926 10.5 Jo
930 11.0 Pt
932 10.3 Sz
940 9.8 Jo
943 9.6 Jo
943 9.8 Md
943 10.0 Pt
956 10.0 Md
957 10.2 Pt
V CYG
203847
893 13.5 L
916 13.7 L
924 12.8 Pt
927 13.6 L

V CYG
203847
943 14.2 Pt
Y AQR
203905
913[13.3 Pc
921[12.5 Jo
930[12.3 Pt
946[13.3 An
957[12.3 Pt
T DEL
204016
891 14.9 Bk
893 14.5 L
916 14.1 L
921 14.2 Bk
926 14.1 Br
928 14.2 L
946 13.7 L
946 13.8 Be
946 13.6 An
953 13.5 Br
957 12.7 Pt
V AQR
204102
893 8.1 L
912 9.2 Md
916 8.3 L
922 9.2 Md
924 9.2 Pt
928 8.7 L
929 9.2 Me
930 9.5 Pt
943 9.0 Pt
946 8.9 L
956 9.2 Md
957 8.9 Pt
W AQR
204104
894 9.6 L
903 9.7 Cy
916 10.1 Cy
916 9.7 L
924 10.5 Cy
928 10.1 L
944 10.6 Cy
946 10.9 L
951 11.5 Cy
U CAP
204215
930 13.5 El
955 11.8 El
V DEL
204318
891 14.5 Bk
921 15.0 Bk
928[13.9 L
957[14.4 Br

T AQR
204405
943 12.0 Jo
943 12.7 Pt
946 12.0 An
946 12.2 Be
948 11.8 Jo
957 11.3 Pt
RZ CYG
204846
924 13.2 Pt
930 13.0 Pt
943 12.8 Br
943 13.1 Pt
957 13.2 Pt
S IND
204954
866[13.5 Sl
900[13.5 Bl
920[11.7 En
X DEL
205017
894 9.6 Md
908 9.7 L
912 9.7 Md
918 9.9 Me
918 10.4 L
922 10.1 Md
923 10.2 Hu
924 10.3 Pt
928 10.5 L
930 9.8 Pt
943 11.3 L
943 11.2 Pt
955 11.2 Br
957 11.7 Pt
UX CYG
205030a
943 13.9 Br
RR CAP
205627
920 10.8 En
T OCT
205782
886 12.5 Sl
R VUL
205923a
885 8.2 Ch
893 8.5 Jo
893 8.6 Ah
894 8.9 Ah
899 9.2 Ah
901 9.0 Jo
908 9.8 Jo
912 10.2 Jo
914 11.3 Md
916 11.1 Ah
917 11.7 Jo
921 12.1 Jo
922 11.8 Md

R VUL
205923a
923 11.3 Hu
924 12.2 Pt
925 12.5 Jo
930 12.6 Pt
943 12.6 Pt
957 12.4 Pt
V CAP
210124
900 10.5 Bl
904 10.7 Bl
912 11.1 L
920 11.5 Gy
924 11.7 Gy
928 11.4 L
956[12.5 Gy
TW CYG
210129
884 10.0 Ch
910 11.0 Md
912 11.8 L
922 11.7 Md
922 12.6 Br
927 12.0 L
946 12.8 L
953 12.6 Br
X CAP
210221
900[12.7 Bl
930[11.7 Pt
957 11.8 Pt
X CEP
210382
892 14.8 Bk
922 15.0 Bk
957[15.3 Br
RS AQL
210504
912 11.1 L
924 10.2 Pt
928 10.9 L
930 11.0 Pt
943 10.4 Pt
957 10.6 Pt
Z CAP
210516
912 11.1 L
924 10.9 Pt
926 10.8 L
930 10.6 Pt
943 10.1 Pt
957 10.2 Pt
R EQU
210812
891 14.7 Bk
912 14.2 L
922 14.7 Bk
928 14.1 L
943 14.5 Br

R EQU
210812
957 13.6 Pt
T CEP
210868
880 9.8 Ch
890 10.1 Si
891 10.3 Si
892 10.0 Mn
893 9.8 Th
893 9.6 Jo
894 10.0 We
894 10.3 Si
895 10.3 Si
895 9.6 Jo
896 10.1 Mn
898 9.8 Ah
899 10.4 Si
899 10.0 Th
903 9.4 Bg
903 10.2 Si
908 9.7 Jo
909 10.1 Wd
910 10.2 Mn
911 10.1 Ah
912 10.1 Wd
912 9.6 Jo
915 10.4 Mn
916 10.4 Si
916 10.0 Ah
917 9.8 Jo
917 10.1 Wd
919 10.3 Me
919 10.3 Mn
920 10.2 Gy
921 9.8 Jo
922 10.4 Mn
922 10.0 We
923 10.0 Pt
923 10.0 Si
924 10.2 Si
924 9.9 Jo
924 10.0 Gy
924 9.8 Hf
924 10.0 Wd
925 10.3 Si
926 9.9 Jo
927 10.4 Mn
928 10.1 Th
929 10.1 Ah
930 10.1 Pt
931 10.2 Gy
932 9.9 Wd
932 10.0 Ah
935 9.8 Hf
935 9.8 Wd
936 9.8 Si
938 10.0 Si
940 9.9 Ah
940 10.1 Mn

T CEP
210868
941 9.4 Jo
941 9.8 Si
941 10.0 Wd
942 10.0 Th
942 9.8 Si
942 9.8 Gy
943 9.8 Pt
945 9.8 Ah
945 9.9 Mn
946 9.7 El
948 9.6 Jo
948 9.9 Si
950 9.7 Mn
950 9.8 El
955 9.7 El
956 9.8 Gy
957 9.2 Pt
960 9.0 Sh
960 9.2 Wd
962 9.3 Gy
RR AQR
210003
912 13.6 L
923 13.0 Pt
926 12.9 L
930 12.9 Pt
943 12.0 Pt
957 10.7 Pt
X PEG
211614
912 11.4 L
913 11.2 Jo
919 11.1 Jo
921 11.1 Jo
923 10.8 Pt
926 10.6 L
930 10.8 Pt
943 10.0 L
943 10.5 Pt
945 10.0 Br
957 9.6 Pt
961 9.7 Wa
T CAP
211615
900 10.5 Bl
912 10.9 L
928 11.7 L
S MIC
212030
900 10.0 Bl
914 10.1 En
919 10.1 En
Y CAP
212814
900[13.1 Bl
928[14.3 L

VARIABLE STAR OBSERVATIONS RECEIVED DURING SEPTEMBER, 1932.

J.D.	Est.	Obs.	J.D.	Est.	Obs.	J.D.	Est.	Obs.	J.D.	Est.	Obs.	J.D.	Est.	Obs.	J.D.	Est.	Obs.
W CYG			**RU CYG**			**RV CYG**			**T PEG**			**R LAC**			**R PEG**		
213244			213753			213937			220412			223841			230110		
890	6.4	Si	893	8.4	Th	923	6.6	Pt	916	12.5	L	916	12.7	L	932	7.0	Ah
891	6.6	Si	894	8.4	Ah	930	6.6	Pt	928	12.9	L	928	13.4	L	940	7.0	Ah
894	6.4	Si	897	8.0	Jo	943	6.6	Pt	945	13.6	Br	930	13.0	Pt	940	7.3	Jo
895	6.0	Si	899	8.2	Ah	957	6.6	Pt		Y PEG		953	13.9	Br	941	7.4	Sf
899	6.0	Si	901	8.0	Jo		RR PEG			220613			S AQR		942	7.0	Gv
903	6.1	Si	902	8.0	Ah		214024		923	12.5	Pt		*225120*		943	7.3	GD
907	6.0	Si	907	8.2	Je	923	13.6	Pt	930	12.8	Pt	948	8.0	Jo	943	6.8	Jo
910	6.3	Mc	908	8.1	Jo	943	13.5	Pt	945	[14.6	Br		RW PEG		945	7.1	Ah
911	6.1	Mc	910	8.2	Mc	957	[14.1	Br	956	[13.7	Br		225914		946	7.0	Ah
912	6.4	Mc	912	8.5	Mc		R GRU			RS PEG		894	11.4	L	946	7.1	Pt
912	6.4	L	912	7.8	Jo		*214247*			220714		898	11.4	Jo	953	7.6	Br
913	6.4	Si	914	8.0	Je	900	[13.7	Bl	912	13.4	L	912	10.5	Jo	955	7.2	GD
915	6.2	Mc	915	8.5	Mc	919	[12.4	En	928	13.6	L	913	10.3	L	956	7.5	Gy
916	6.0	Si	914	7.9	Ah		V PEG		945	13.1	Br	918	10.3	Sz	957	7.7	Sf
918	6.4	Mc	916	7.9	Ah		215605		946	13.0	Pt	919	10.2	Jo	957	7.1	Pt
922	6.5	Mc	917	7.8	Jo	912	12.7	L		X AQR		921	9.7	Jo	962	7.7	Gy
922	6.5	Si	918	8.6	Mc	923	11.6	Pt		*221321*		922	10.2	Me		V CAS	
924	6.6	Si	919	7.9	Ry	926	11.5	L	957	[13.4	Me	923	10.3	Pt		230759	
925	6.3	Si	920	7.8	Jo	930	10.8	Pt		T GRU		925	10.0	Jo	866	11.3	Cy
926	6.7	L	922	8.7	Mc	943	9.8	Pt		*221938*		926	10.4	L	887	9.5	Cy
929	6.0	Si	923	7.6	Pt	947	9.3	L	914	8.7	En	926	9.5	We	894	9.3	Ah
936	6.3	Si	924	7.8	Ry	957	9.3	Pt	919	8.9	En	928	10.0	Jo	897	9.3	Cy
941	6.6	Si	924	8.0	Jo		U AQR			S GRU		930	9.8	Pt	897	9.2	Ko
942	6.8	Si	928	7.7	Jo		*215717*			*221948*		932	10.1	Sz	898	9.5	Ah
943	6.7	L	928	7.6	Th	894	11.0	L	914	7.4	En	941	9.8	Jo	899	9.1	Ah
944	6.8	Mc	929	7.7	Th	916	11.6	L	919	7.2	En	943	10.0	We	902	9.4	Ah
946	6.9	Mc	929	7.6	Ry	923	11.7	Pt		RV PEG		945	10.4	Be	906	8.9	Ko
948	6.6	Si	930	7.8	Pt	928	12.2	L		222129		945	10.3	L	907	9.1	Ah
949	6.8	Si	930	7.8	Ah	930	11.8	Pt	912	13.5	L	946	10.5	Pt	911	9.0	Ah
949	7.0	Mc	931	7.8	Ah	943	11.7	Pt	928	13.1	L	952	10.5	Br	914	9.3	Ah
951	6.9	Mc	930	7.6	Th	957	11.6	Pt	945	13.7	Br	957	10.5	Me	914	8.9	Cy
952	6.9	Mc	931	7.5	Ry		RT PEG		953	13.5	Br	959	11.1	Wa	915	8.2	We
953	6.7	Mc	932	7.8	Ah		215934			S LAC		961	11.2	Wa	916	8.8	Ko
	S CEP		935	7.5	Th	945	[13.0	Br		222439		964	11.2	Wa	921	8.4	Jo
	213678		937	7.6	Th	957	14.5	Br	894	11.5	Jo		β PEG		923	8.7	Pt
888	11.7	Cy	939	7.6	Th		RY PEG		894	12.2	L		*225927*		924	8.8	Cy
893	12.0	Jo	939	7.5	Jo		220133a		897	11.7	Jo	910	2.7	Mc	924	8.4	Jo
897	11.7	Cy	940	7.8	Ah	922	11.8	Me	902	12.1	Ko	915	2.5	Mc	928	8.2	Jo
903	11.4	Bg	940	7.5	Ry	929	12.7	Bw	916	12.8	L	944	2.5	Mc	928	8.2	Me
913	11.8	Cy	942	7.5	Th	934	12.9	Bw	923	12.8	Pt	946	2.3	Mc	929	8.6	Ah
917	12.3	Jo	943	7.7	Me	957	11.8	Pt	928	13.1	L	949	2.6	Mc	930	8.2	Pt
918	11.8	Cy	943	7.8	Pt		RZ PEG		930	12.6	Pt	951	2.4	Mc	932	8.5	Ah
921	12.4	Jo	944	8.8	Mc		220133b		949	13.3	El	953	2.6	Mc	932	8.5	Cy
922	12.1	Md	944	7.6	Th	894	8.9	L	955	13.1	El		R PEG		933	8.4	Ah
923	11.8	Pt	945	8.0	Ah	916	9.1	L		R IND			230110		934	8.0	Ko
924	11.9	Cy	946	7.9	Ah	922	9.6	Me		*222867*		899	9.2	Ah	939	7.7	Jo
924	12.3	Jo	946	8.5	Mc	923	9.5	Pt	900	10.0	Bl	902	9.0	Ah	939	8.1	Cy
926	12.5	Jo	947	7.5	Th	924	9.5	Bg	914	10.2	En	912	7.8	Sf	940	8.2	Ah
940	11.7	Md	948	7.6	Th	926	9.3	We	919	11.2	En	914	7.8	Ah	943	7.7	Ko
941	11.8	Jo	948	7.7	Jo	928	9.5	L		T TUC		918	7.2	GD	943	7.7	Jo
943	11.6	Me	948	7.5	Ry	929	10.4	Bw		*223462*		920	7.5	Gy	943	8.0	Me
943	11.5	Pt	949	8.7	Mc	930	10.5	Pt	914	8.7	En	923	7.1	Pt	943	7.6	We
944	11.8	Cy	952	8.6	Mc	934	10.8	Bw	919	8.2	En	924	7.0	Gy	945	8.0	Ah
951	11.4	Cy	953	8.7	Mc	946	10.0	Pt		R LAC		928	7.2	Me	946	8.1	Ah
956	11.2	Md	957	7.5	Pt	957	10.5	Pt		223841		929	7.0	Ah	946	8.0	Pt
	RU CYG		961	7.6	Ry		T PEG		894	11.8	Jo	930	7.2	Pt	946	7.9	Sf
	213753						220412		894	12.3	L	931	7.0	Gy	948	7.8	Jo
893	8.4	Jo				894	11.6	L	897	12.0	Jo	931	7.1	Ah	949	8.2	Cy

Variable Star Observations Received During September, 1932.

J.D.	Est.	Obs.	J.D.	Est.	Obs.	J.D.	Est.	Obs.	J.D.	Est.	Obs.	J.D.	Est.	Obs.	J.D.	Est.	Obs.
V Cas			**V Phe**			**ST And**			**R Aqr**			**R Cas**			**R Cas**		
230759			*232746*			233335			*233815*			235350			235350		
949	8.4	El	914	9.3	En	934	10.7	Cy	948	7.8	Si	907	8.8	Hf	945	9.6	Br
957	8.2	Pt	919	9.2	En	939	10.5	Jo	949	8.1	Bc	907	8.8	Wd	946	9.0	Jo
957	8.0	Sf	**Z And**			943	10.3	Jo	949	8.2	Ko	910	8.7	Mn	950	9.5	Mn
W Peg			232848			945	10.7	Cy	949	7.9	An	912	8.7	Wd	953	9.5	Gy
231425			867	10.6	Cy	946	10.8	Ah	951	8.1	Bc	912	7.8	Jo	956	9.6	Gy
893	9.1	Jo	897	10.8	Cy	946	10.1	Pt	951	8.3	Hf	914	8.9	Ah	960	9.2	Sh
895	8.8	Jo	916	10.7	Cy	948	10.4	Jo	951	8.3	Wd	914	8.0	We	960	9.4	Wd
898	8.9	Jo	923	10.4	Pt	951	10.9	Cy	957	8.4	Me	915	8.9	Mn	962	9.5	Gy
899	9.8	Ah	924	10.7	Cy	958	11.0	Pt	958	8.1	Pt	917	8.1	Jo	**Z Peg**		
901	9.8	Jo	924	10.8	Jo	**R Aqr**			961	8.2	Wa	919	9.0	Hf	235525		
908	9.7	L	928	10.7	Cy	*233815*			**Z Cas**			919	8.3	Gy	913	13.1	L
912	9.2	Jo	928	10.6	Me	894	8.2	L	233956			919	8.9	Wd	923	12.8	Pt
914	9.3	Jo	930	10.8	Pt	900	7.7	Bl	913	13.1	L	919	9.1	Mn	928	13.1	L
916	9.9	Ah	931	10.7	Bw	902	8.1	Ko	925	11.5	Jo	920	8.3	Jo	930	12.8	Pt
917	9.5	Jo	934	10.5	Cy	908	8.0	Jo	929	12.0	L	922	9.1	Mn	946	13.0	Pt
918	9.9	L	939	10.8	Cy	908	8.2	L	932	11.5	Bw	924	8.9	Hf	953	13.2	Br
920	9.5	Jo	945	11.1	Cy	912	8.1	Jo	945	10.2	Br	924	8.7	Gy	957	12.5	Pt
923	9.9	Hu	946	10.6	Pt	913	7.9	Jo	**TX Cep**			924	8.9	Wd	**W Cet**		
924	9.9	Jo	949	11.1	Cy	913	8.0	Ko	234875			924	8.3	Jo	*235715*		
925	10.2	Hu	957	10.6	Pt	914	7.8	Jo	945	13.5	Br	925	8.5	Jo	902	8.3	Ko
928	9.8	Jo	**ST And**			919	7.8	Jo	956	13.5	Br	925	8.8	Me	913	8.0	Ko
928	10.0	L	233335			919	7.8	We	**RR Cas**			927	9.0	Mn	928	8.0	Jo
929	9.9	Bw	867	9.5	Cy	920	7.9	Jo	235053			928	9.2	Sh	943	6.5	We
931	10.0	Ah	894	9.0	Jo	922	8.1	Me	908	[12.5	Jo	928	9.1	Wd	949	8.4	Ko
939	9.6	Jo	897	9.5	Cy	923	8.5	Pt	925	[13.1	Bn	928	8.7	Me	**Y Cas**		
941	9.8	Jo	898	9.7	Ah	924	8.2	Jo	943	11.5	Jo	928	8.4	Jo	235855		
943	9.7	Jo	898	9.3	Jo	925	8.0	We	**V Cet**			930	9.1	Ah	894	11.5	Jo
945	10.6	L	ЧV	0'0I	006	926	8.1	Me	*235209*			931	9.3	Gy	894	11.2	L
945	10.5	Be	901	9.3	Jo	926	8.3	L	900	[11.7	Bl	932	9.1	Wd	898	11.7	Jo
946	10.2	Ah	908	9.5	Jo	926	8.2	Jo	**R Tuc**			935	8.9	Hf	916	11.8	L
948	10.2	Jo	912	9.6	Jo	928	8.0	Jo	*235265*			935	9.0	Sh	925	10.7	Jo
S Peg			914	9.8	Jo	928	8.1	Bc	887	10.3	Sl	935	9.0	Wd	928	12.2	L
231508			916	10.2	Ah	930	8.2	Pt	914	12.4	En	940	9.2	Ah	945	12.6	Br
913	12.8	L	916	10.3	Cy	935	8.3	Ko	**R Cas**			940	9.0	Mn	**SV And**		
923	12.6	Pt	917	10.5	Jo	941	8.3	Jo	235350			941	9.2	Wd	235939		
928	12.8	L	920	10.1	Jo	942	8.4	L	892	8.5	Mn	941	8.8	Jo	921	11.5	Jo
946	12.8	Pt	923	10.0	Pt	943	8.1	Me	893	7.5	Jo	942	9.4	Gy	923	13.6	Pt
951	11.6	Cy	924	10.6	Cy	943	8.1	Bf	893	8.2	Ah	944	9.3	Je	930	13.5	Pt
953	12.2	Br	924	10.2	Jo	943	8.1	Bc	895	7.6	Jo	944	9.1	Sh	946	12.7	Pt
957	12.6	Pt	928	10.4	Jo	946	8.1	Bc	896	8.5	Mn	944	9.2	Wd	953	12.7	Br
			930	10.2	Pt	946	8.1	Pt	899	8.4	Ah	945	9.2	Mn	957	12.6	Pt
			931	10.5	Ah	946	7.9	Si	901	7.7	Jo	945	9.4	Je			
						946	8.1	Jo	902	8.5	Ah	945	9.2	Ah			

Rapidly Varying Irregular Variables.

Star	J.D.	Est.	Obs.	J.D.	Est.	Obs.	Star	J.D.	Est.	Obs.	J.D.	Est.	Obs.
005840 RX Andromedae—							005840 RX Andromedae—						
	6909	12.5	Pt	6924.7	13.1	Ry		6932	11.5	Pt	6941	11.7	Pt
	6912	11.8	Pt	6925.8	13.0	Ry		6932.7	11.6	Ry	6941.6	12.3	Ry
	6914	11.5	Pt	6927	13.0	Pt		6933	11.5	Pt	6942	12.6	Pt
	6916	11.5	Pt	6928	13.0	Pt		6934	11.5	Pt	6943	13.1	Pt
	6918	11.8	Pt	6928.7	12.5	Me		6935.7	10.5	Ry	6944.7	[12.1	Me
	6918.7	12.2	Me	6929.7	13.2	Ry		6938	11.1	Pt	6945.8	13.6	Br
	6919.7	12.8	Ry	6930	13.2	Pt		6939	11.5	Pt	6946	13.1	Pt
	6920.7	[12.5	Ry	6931	11.6	Pt		6939.7	11.0	Ry	6946.6	13.5	Ry
	6923	13.1	Pt	6931.8	12.1	Ry		6940	11.5	Pt	6948	13.0	Pt

VARIABLE STAR OBSERVATIONS RECEIVED DURING SEPTEMBER, 1932.

Star	J.D.	Est.	Obs.	J.D.	Est.	Obs.
005840 RX ANDROMEDAE—						
	6949.7	13.0	Ry	6957	13.0	Pt
	6949.9	13.1	Me	6957.7	13.0	Me
	6951	11.5	Pt	6958	13.0	Pt
	6952	11.6	Pt	6958.9	13.0	Me
	6953.8	12.5	Br	6959.9	13.0	Me
	6955	13.0	Pt	6960	13.0	Pt
	6956	13.0	Pt	6961.6	13.0	Me
	6956.8	13.2	Br			
060547 SS AURIGAE—						
	6827.8	13.0	Br	6932.9	12.0	Cy
	6894.6	10.8	L	6932.9	12.3	Pt
	6908.6	12.0	L	6933.8	12.3	Ry
	6913.6	13.9	L	6933.9	12.3	Cy
	6916.6	12.5	L	6934.9	12.5	Pt
	6917.6	12.5	L	6935.8	11.5	Pt
	6922.9	14.6	Bk	6938.8	12.6	Pt
	6923.9	12.6	Pt	6939.6	12.5	L
	6924.8	12.5	Cy	6941.8	11.0	Pt
	6925.8	12.5	Ry	6943.6	12.5	L
	6926.6	13.9	L	6945.6	14.3	L
	6927.9	12.6	Pt	6946.7	12.5	Pt
	6928.6	12.0	L	6947.6	13.3	L
	6928.8	11.3	Cy	6948.9	12.6	Pt
	6928.9	12.0	Pt	6949.6	14.3	L
	6929.8	10.8	Ry	6951.9	12.6	Pt
	6929.9	10.4	Cy	6952.9	12.5	Cy
	6930.6	10.7	L	6955.8	12.6	Pt
	6930.8	10.6	Cy	6956.7	12.6	Pt
	6931.8	11.2	Ry	6957.7	12.5	Ry
	6931.9	11.4	Me	6958.9	13.1	Me
	6931.9	11.7	Pt	6959.9	13.0	Me
	6932.6	11.0	L	6960.9	12.6	Pt
	6932.8	11.8	Ry	6961.9	12.8	Me
074922 U GEMINORUM—						
	6827.8	13.7	Br	6949.6	12.4	L
	6932.9	12.3	Cy	6951.9	13.3	Pt
	6933.9	9.3	Cy	6952.9	12.3	Cy
	6943.6	11.4	L	6958.9	13.3	Me
	6945.9	9.3	Cy	6959.9	12.7	Me
	6947.6	11.4	L	6960.9	12.4	Pt
	6948.9	12.3	Pt			
081473 Z CAMELOPARDALIS—						
	6827.8	12.7	Br	6914.7	11.8	Pt
	6887.7	11.1	Cy	6916.4	11.3	L
	6891.4	12.8	L	6916.7	11.8	Pt
	6891.7	12.3	Bk	6917.4	10.8	L
	6892.7	12.3	Bk	6918.4	10.6	L
	6893.5	12.8	L	6918.4	10.9	Gt
	6893.7	12.7	Bk	6918.4	11.0	Be
	6894.4	13.1	L	6918.4	10.8	An
	6894.7	12.7	Bk	6918.7	11.5	Pt
	6895.7	12.7	Bk	6918.7	10.9	Bg
	6908.3	13.1	L	6918.7	11.0	Me
	6912.3	13.1	L	6919.7	11.0	Me
	6912.7	12.9	Pt	6919.7	10.5	Bg
	6913.3	13.1	L	6919.8	11.4	Pt
	6913.7	12.2	Cy	6920.7	11.0	Pt
	6914.4	11.9	L	6920.7	11.2	Me
081473 Z CAMELOPARDALIS—						
	6921.6	11.3	Bk	6940.6	11.7	Me
	6922.6	11.5	Bk	6940.7	12.2	Pt
	6922.7	11.5	Me	6941.8	12.1	Pt
	6923.4	11.8	L	6942.3	11.6	L
	6923.7	11.7	Me	6942.3	11.5	Be
	6923.7	11.8	Bg	6942.6	11.9	Me
	6923.8	11.5	Pt	6942.7	11.9	Pt
	6924.6	12.2	Cy	6943.6	11.7	Me
	6924.7	12.4	Pt	6943.6	11.7	L
	6924.7	12.0	Me	6943.7	11.6	Pt
	6924.8	12.5	Bg	6944.7	11.1	Me
	6925.3	12.3	L	6945.4	10.6	L
	6926.8	13.1	Pt	6945.4	10.6	Be
	6927.3	12.9	L	6945.9	11.2	Cy
	6927.8	12.7	Pt	6947.6	11.5	L
	6928.4	13.1	L	6948.7	11.5	Pt
	6928.7	12.2	Pt	6948.9	11.3	Me
	6929.4	13.1	An	6949.4	11.5	L
	6929.4	13.1	L	6949.6	11.7	Me
	6931.7	12.5	Pt	6949.9	11.6	Me
	6932.7	12.1	Pt	6951.7	12.4	Pt
	6932.3	13.1	L	6951.7	12.1	Cy
	6933.9	12.5	Pt	6952.7	12.4	Pt
	6927.7	12.1	Pt	6955.8	12.8	Pt
	6928.3	12.8	L	6956.7	12.6	Pt
	6928.3	12.8	Be	6957.7	12.8	Pt
	6928.8	12.2	Pt	6957.7	12.8	Me
	6929.4	12.3	L	6958.7	12.8	Pt
	6939.4	12.2	Gt	6958.9	13.1	Me
	6939.4	12.2	An	6959.8	12.7	Pt
	6939.7	12.1	Pt	6959.9	13.2	Me
	6940.3	11.4	Gt	6961.9	13.0	Me
	6940.3	11.4	L	6962.7	12.2	Pt
	6940.6	11.4	Cy			
094512 X LEONIS—						
	6827.8	12.6	Br			
202946 SZ CYGNI—						
	6902	9.2	Pt	6934	9.5	Pt
	6903	9.3	Pt	6935	9.6	Pt
	6906	9.8	Pt	6927	9.6	Pt
	6907	9.7	Pt	6938	9.6	Pt
	6908	9.8	Pt	6939	9.5	Pt
	6912	9.2	Pt	6940	9.4	Pt
	6914	9.3	Pt	6941	9.0	Pt
	6916	9.2	Pt	6942	9.0	Pt
	6918	9.5	Pt	6943	9.2	Pt
	6919	9.5	Pt	6944	9.4	Pt
	6920	9.7	Pt	6945	9.4	Pt
	6923	9.6	Pt	6946	9.4	Pt
	6924	9.5	Pt	6948	9.7	Pt
	6926	9.2	Pt	6950	9.7	Pt
	6927	8.8	Pt	6951	9.7	Pt
	6928	9.1	Pt	6952	9.7	Pt
	6929	9.0	Pt	6955	9.5	Pt
	6930	9.3	Pt	6956	9.6	Pt
	6931	9.3	Pt	6957	9.0	Pt
	6932	9.5	Pt	6958	8.9	Pt
	6933	9.4	Pt	6959	9.0	Pt

VARIABLE STAR OBSERVATIONS RECEIVED DURING SEPTEMBER, 1932.

Star	J.D.	Est.	Obs.	J.D.	Est.	Obs.	Star	J.D.	Est.	Obs.	J.D.	Est.	Obs.
202946 SZ CYGNI—							213843 SS CYGNI—						
	6960	9.2	Pt	6962	9.2	Pt		6917.6	8.6	Jo	6923.6	10.2	Bg
	6961	8.9	Pt					6917.6	9.0	L	6923.6	10.2	Cy
213843 SS CYGNI—								6917.6	8.4	Wd	6923.7	10.5	GD
	6870.7	8.7	Lg	6908.6	10.6	L		6917.7	8.3	Cy	6923.7	10.4	Me
	6881.2	11.7	Ch	6908.6	10.8	Bg		6917.7	8.5	We	6923.7	10.5	Bc
	6883.7	11.6	Cy	6908.6	11.7	Jo		6917.7	8.5	Si	6923.7	10.1	Si
	6885.2	11.8	Ch	6908.6	11.2	Cy		6918.4	9.0	Bc	6923.8	10.3	Br
	6887.7	12.0	Cy	6908.7	11.5	Pt		6918.4	8.9	Gt	6923.8	10.5	Pt
	6888.7	12.0	Cy	6909.6	10.8	Wd		6918.4	8.7	An	6924.7	11.3	We
	6890.6	12.2	Cy	6909.6	10.3	Bg		6918.4	8.9	L	6924.6	10.5	Si
	6891.6	12.2	Cy	6909.8	10.8	Cy		6918.6	8.5	Sf	6924.6	11.0	Jo
	6891.7	12.0	Bc	6909.8	10.2	Md		6918.6	8.7	Si	6924.6	10.5	Ry
	6893.4	12.0	Ah	6910.7	10.3	We		6918.6	8.7	Jo	6924.7	10.8	Pt
	6893.5	11.6	L	6910.7	10.0	Bg		6918.7	8.5	Sz	6924.7	10.3	Bg
	6893.6	11.8	Jo	6911.1	9.6	Hr		6918.7	8.7	We	6924.7	10.6	Me
	6893.7	12.0	Bc	6911.4	10.0	Ah		6918.7	9.0	Bc	6924.7	11.0	Cy
	6894.4	11.8	Ah	6911.7	9.6	We		6918.7	8.4	Cy	6924.8	10.6	Md
	6894.4	11.8	Bc	6911.7	9.9	Bg		6918.7	9.2	Pt	6925.7	11.3	We
	6894.4	11.8	Jo	6912.0	9.6	Hr		6918.7	8.9	Bg	6925.7	10.6	Hu
	6894.6	11.5	L	6912.4	9.6	L		6918.7	9.0	GD	6925.4	11.2	Ah
	6895.6	12.0	Jo	6912.6	9.8	Sf		6918.7	9.0	Bf	6925.4	10.2	L
	6895.7	12.0	Bc	6912.6	10.0	Jo		6918.7	9.4	Me	6925.6	11.5	Cy
	6895.7	11.9	Cy	6912.7	9.8	Pt		6918.9	8.9	Me	6925.6	11.6	Jo
	6897.6	12.0	Jo	6912.7	9.7	Bg		6919.6	8.9	Ry	6925.6	11.1	Ry
	6897.7	12.0	Bc	6912.7	9.8	GD		6919.6	8.8	Jo	6925.7	10.8	Si
	6897.7	12.0	Bf	6913.1	9.4	Hr		6919.6	8.9	Wd	6925.8	11.0	Me
	6897.8	11.9	Cy	6913.4	9.5	L		6919.6	8.9	Hf	6926.5	11.8	L
	6898.5	11.8	Ah	6913.6	9.6	Sf		6919.7	8.6	We	6926.6	11.8	Jo
	6898.6	11.8	Jo	6913.6	9.5	Pc		6919.7	9.0	Cy	6926.6	11.6	Cy
	6899.4	11.8	Ah	6913.6	9.7	Bc		6919.7	9.0	Bg	6926.7	11.7	Me
	6899.6	12.0	Bf	6913.6	9.3	Cy		6919.7	9.0	Me	6926.7	11.5	Bc
	6899.6	12.0	Bc	6913.6	9.7	Jo		6919.7	8.9	Si	6926.8	11.5	Br
	6899.8	12.0	Cy	6913.7	8.8	We		6919.8	9.0	Me	6926.8	11.8	Pt
	6900.5	11.7	Ah	6912.7	9.9	Wd		6919.8	9.2	Pt	6927.4	11.8	L
	6900.8	12.0	Cy	6913.7	9.5	Bg		6919.8	9.3	Lg	6927.7	12.1	Me
	6901.6	11.8	Jo	6913.7	9.7	GD		6920.0	8.9	Hr	6927.8	11.8	Pt
	6901.6	12.0	Cy	6913.7	9.1	Si		6920.6	9.5	Bc	6928.4	12.0	L
	6902.4	11.7	Ah	6913.9	9.3	Me		6920.6	9.2	Jo	6928.6	11.8	Ry
	6902.6	12.0	Cy	6914.1	9.3	Hr		6920.6	9.1	Ry	6928.6	12.0	Jo
	6902.7	11.7	Pt	6914.4	9.2	Ah		6920.7	8.7	We	6928.6	11.9	Cy
	6903.7	12.0	Bc	6914.6	9.4	Jo		6920.7	9.5	Pt	6928.6	12.1	Wd
	6903.7	12.0	Bf	6914.6	9.2	Sf		6920.7	9.2	Me	6928.7	11.8	Pt
	6903.7	12.0	Cy	6914.7	8.8	Si		6920.8	9.2	Me	6928.7	12.1	Me
	6903.7	11.6	Pt	6914.7	8.8	We		6921.7	9.0	We	6929.3	12.0	An
	6903.7	11.9	Bg	6914.7	9.1	Cy		6921.6	9.9	Jo	6929.3	12.0	Be
	6904.4	12.0	Be	6914.7	9.5	Pt		6921.6	9.5	Ry	6929.4	12.0	L
	6904.4	12.0	An	6915.4	9.0	Ah		6921.8	9.6	Md	6929.4	11.9	Gt
	6904.7	12.0	Bc	6915.7	8.6	We		6922.7	9.9	We	6929.6	12.0	Cy
	6904.7	12.0	Bf	6915.8	9.3	Md		6922.4	9.4	An	6929.6	11.9	Ry
	6905.7	12.0	Bc	6916.4	8.8	Ah		6922.7	10.0	Bg	6929.6	12.0	Wd
	6905.7	12.0	Bf	6916.6	8.9	Bg		6922.7	10.0	Me	6929.7	12.1	Me
	6906.6	11.9	Bg	6916.6	8.9	L		6922.7	9.5	Bc	6930.4	11.8	Ah
	6906.7	11.7	Pt	6916.6	8.8	Sf		6922.7	9.7	Si	6930.6	11.9	Cy
	6907.4	11.8	Ah	6916.6	8.6	Si		6922.8	10.1	Br	6930.7	12.0	Bf
	6907.7	12.0	Cy	6916.7	8.5	We		6923.7	10.3	Hu	6930.7	12.0	Bc
	6909.7	11.2	We	6916.7	8.2	Cy		6923.7	10.7	We	6930.7	12.1	Me
	6907.7	11.7	Pt	6916.7	9.3	Pt		6923.4	10.3	Ah	6930.8	11.7	Pt
	6908.4	10.5	L	6916.7	8.9	Pc		6923.4	10.2	L	6931.4	11.9	Ah

VARIABLE STAR OBSERVATIONS RECEIVED DURING SEPTEMBER, 1932.

Star	J.D.	Est.	Obs.	J.D.	Est.	Obs.	Star	J.D.	Est.	Obs.	J.D.	Est.	Obs.
213843	SS CYGNI—						213843	SS CYGNI—					
	6931.4	12.1	L	6939.4	12.0	An		6944.3	12.0	An	6950.3	12.0	Be
	6931.6	12.0	Ry	6939.4	12.0	Be		6944.3	12.0	Be	6950.6	11.9	Cy
	6931.7	12.0	Bc	6939.4	12.0	Gt		6944.6	11.8	Ry	6950.6	12.1	Ry
	6931.7	11.7	Pt	6939.4	12.0	L		6944.7	12.0	Wd	6950.6	12.1	Me
	6931.8	12.1	Me	6939.6	12.0	Jo		6944.7	12.0	Me	6951.7	12.0	Bc
	6932.7	11.9	Hu	6939.6	11.9	Sf		6944.7	11.9	Cy	6951.7	12.2	Cy
	6932.3	12.0	Hr	6939.6	11.9	Cy		6944.7	11.8	Pt	6951.7	11.8	Pt
	6932.4	11.9	Ah	6939.6	12.0	Bc		6945.3	12.0	Ah	6952.7	11.8	Pt
	6932.4	11.9	An	6939.7	11.7	Pt		6945.3	11.9	Be	6952.9	12.1	Cy
	6932.4	12.1	L	6939.7	11.7	Pt		6945.3	11.9	L	6953.7	12.1	Br
	6932.6	11.9	Wd	6940.3	11.8	Ah		6945.6	12.0	Jo	6953.7	11.7	Pt
	6932.7	12.0	Bc	6940.4	12.0	Gt		6945.6	12.0	Ry	6954.7	12.1	Md
	6932.7	11.9	Ry	6940.6	11.8	Jo		6945.7	11.7	Pt	6955.7	11.9	Br
	6932.9	11.9	Cy	6940.6	12.0	Ry		6945.8	11.9	Cy	6955.8	11.7	Pt
	6932.9	11.9	Me	6940.6	12.0	Me		6945.8	11.9	Md	6956.7	11.7	Pt
	6932.9	11.7	Pt	6940.7	11.8	Me		6945.8	11.9	Br	6956.7	11.8	Br
	6933.4	11.8	Ah	6940.7	12.0	Bc		6946.3	12.0	Ah	6956.7	11.7	Me
	6933.7	12.0	Bc	6940.7	12.0	Cy		6946.3	11.9	An	6957.6	11.9	Sf
	6933.7	11.7	Pt	6940.7	11.7	Pt		6946.3	11.7	Be	6957.7	11.9	Ry
	6933.7	11.9	Cy	6941.6	11.9	Ry		6946.3	11.7	L	6957.7	11.7	Pt
	6933.8	12.0	Ry	6941.6	12.0	Sf		6946.6	11.9	Ry	6957.7	12.0	Br
	6934.7	11.9	Cy	6941.6	12.1	Wd		6946.6	12.0	Sf	6957.7	12.0	Me
	6934.7	11.7	Pt	6941.7	12.0	Cy		6946.7	11.8	Pt	6958.7	11.6	Pt
	6934.6	12.1	Ry	6941.8	11.7	Pt		6946.7	11.8	Bc	6958.9	11.9	Me
	6934.7	11.9	Me	6941.9	12.0	Me		6946.7	11.8	Bf	6959.7	11.7	Pt
	6935.7	12.0	Bc	6942.1	12.0	El		6947.3	12.0	An	6959.7	11.9	Wa
	6935.7	12.0	Bf	6942.3	12.0	Be		6947.3	11.9	Be	6959.9	11.9	Me
	6935.8	11.7	Pt	6942.3	12.0	L		6948.5	12.0	Ry	6960.7	11.7	Pt
	6935.6	11.9	Ry	6942.6	12.2	Me		6948.6	11.8	Jo	6960.7	11.7	Ry
	6936.3	12.1	L	6942.7	11.9	Cy		6948.7	11.9	Pt	6961.6	11.9	Ry
	6936.3	12.0	Be	6942.7	11.8	Pt		6948.9	12.0	Me	6961.6	11.9	Wa
	6936.4	12.0	An	6943.4	12.0	L		6949.4	11.8	L	6961.8	11.7	Pt
	6936.6	12.0	Ry	6943.6	12.1	L		6949.6	12.1	Me	6961.9	11.7	Me
	6937.7	11.7	Pt	6943.6	12.0	Jo		6949.6	12.0	Ry	6962.5	12.0	Wa
	6938.1	12.0	El	6943.6	12.2	Me		6949.7	11.8	Bc	6962.6	11.7	Ry
	6938.3	12.0	L	6943.6	11.9	Ry		6949.7	11.9	Cy	6962.7	11.7	Pt
	6938.3	12.0	Be	6943.7	12.0	Bc		6949.9	12.1	Me	6963.5	12.0	Wa
	6938.4	12.0	Gt	6943.7	12.0	Bf		6950.1	12.3	L	6964.6	12.1	Wa
	6938.7	12.3	Md	6943.7	11.8	Pt		6950.3	12.0	An			
	6938.8	11.7	Pt	6943.8	12.0	Br							

SUMMARY OF OBSERVATIONS, SEPTEMBER, 1932.

Observer	Initial	Vars.	Observations	Observer	Initial	Vars.	Observations
Ahnert	Ah	58	414	Cilley	Cy	37	304
Aldwell	Ad	6	7	Eliason	El	27	110
Ancarani	An	28	62	Ensor	En	91	244
Baldwin, J. M.	Bl	83	148	Gallanti	Gt	13	25
Beck	Bk	61	126	Gregory	Gy	27	124
Benini	Be	24	66	Godfrey Club	GD	11	50
Bigelow	Bw	27	40	Hartmann	Hf	22	60
Brocchi	Br	71	95	Hildom, A.	Hi	12	17
Brown, A. N.	Bn	3	9	Hildom, L.	Hl	3	3
Buckstaff, E.	Bf	10	51	Houghton	Ht	55	178
Buckstaff, R.N.	Bc	17	118	Houston	Hu	24	32
Bunting	Bg	22	80	Huruhata	Hr	1	6
Chandra	Ch	86	115	Jensen	Je	5	31

Observer	Initial	Vars.	Observations	Observer	Initial	Vars.	Observations
Jones	Jo	123	764	Proctor	Pc	17	32
Kohman	Ko	22	108	Recinsky	Re	3	12
Lacchini	L	165	576	deRoy	Ry	8	78
Lee	Le	2	3	Shinkfield	Sl	39	110
Logan	Lg	13	17	Shultz	Sz	16	24
Marsh	Ma	20	28	Simpson	Si	20	186
McLeod	Mc	26	204	Smith, F.W.	Sf	16	45
McPherson	Mp	8	16	Smith, L.	Sh	8	17
Meek	Me	92	316	Thiele	Th	14	77
Mennella	Mn	22	150	Watson	Wa	13	19
Millard	Md	22	72	Webb	Wd	22	135
O'Byrne	Oy	3	9	Wetherbee	We	35	82
Peltier	Pt	233	1046				
Percival	Pr	6	9	Totals		52	439	6650

Star Section of the British Astronomical Association, Professor H. Grouiller, Secretary of the French Variable Star Association, Mr. William Tyler Olcott, Secretary of the American Association of Variable Star Observers, Mr. David B. Pickering, Chairman of the A.A.V.S.O. Chart Committee, Professor A. Danjon, Director of the Observatory at Strasbourg, and Messrs. W. H. Steavenson and W. H. Lindley of the English observers, with Professor B. H. Dawson of Observatorio Nacional at La Plata, Argentina.

Observers contemplating the inclusion of variables in their observing program for which no approved sequences at present exist are requested to communicate with the Secretary of this committee in order to learn the status of the sequences in question. Volunteer observers having suitable means for determining stellar magnitudes are requested to join with this committee in this more or less extensive program, and they should address Leon Campbell, Harvard Observatory, Cambridge, Mass., for further particulars. Under this program, many of the stars cited in Nijland's well-known list of stars needing closer attention will be taken care of as well as other important variables suitable for observation by strictly visual methods.

LEON CAMPBELL, Recorder.

October 10, 1932.

Meteor Notes from the American Meteor Society

By CHARLES P. OLIVIER, President

Shortly after the appearance of these notes, the Leonid meteors are expected. That there may be no possible misapprehension on anyone's part, the writer desires to repeat that no human skill can definitely predict what a meteor stream is going to do. Therefore this November, although, with what appears good reason, we hope for an excellent display, nobody can predict with certainty what will happen. Our hopes are based on three things: at 33-year intervals great showers have been reported at about the proper dates twenty times since 902 A.D.; the reported numbers have been steadily increasing for the past three Novembers as we would expect just before a maximum; finally, computations of the perturbations to which we believe the stream has been subjected since its last return to perihelion show that it has been shifted much nearer the earth's orbit. Hence we have hopes that this year's return will rival the one in 1866, but not that in 1833.

On the basis of these expectations, A.M.S. members of some experience who

live within 100 miles of one another have been requested to undertake simultaneous observations, particularly on long-enduring trains for their parallax and the further determination of their drift. A number of gratifying responses have already been received, and we are confident that earnest attempts will be made to carry out the program. For isolated members or others interested in the subject, it is recommended that they carry out the usual observations, plotting or counting as they have done in the past in August or November. We are organizing locally a group of eight stations, extending from here to Virginia, with Baltimore about central. Simultaneous observations, all made towards the center from the peripheral stations, should net a large number of objects seen from at least two stations, and some seen perhaps from all. Should the shower come up to expectations and the weather be favorable, the data should be in sufficient amount to furnish most important results on the meteors themselves and especially on the trains, the latter being of paramount importance.

We take this opportunity to beg all A.M.S. members not to give out ill-advised advance interviews for publication upon this possibly great shower. We assure them that all proper predictions will be given out from here, but so censored that astronomers will not be made ridiculous by extravagant statements, yet the truth will be fully told and the public will have due warning of what may appear.

The accompanying table contains all of the hitherto unpublished 1932 rates received to date from every station except those in New Zealand. The only observations omitted are those for which the observing period was less than an hour or the factor less than 0.5, or for which the data were incomplete. Perseid observations are not given separately; most of the meteors reported from August 5 to 17 may be assumed to be Perseids.

The volume of data sent in to the Society is increasing with gratifying rapidity. We are, however, threatened with the dire necessity of devoting all of our space in Meteor Notes to rates. Inasmuch as the main object in collecting these data is to accumulate them for the study, discussion, and determination of statistical and other facts of meteoric astronomy, the continuous flow of new observations is not only desirable, but is essential for effective work. If, however, the work itself cannot be published because of the mass of data, the advantage of the number and excellence of the observations is lost.

We are therefore considering the advisability of largely discontinuing the publication of rates, and devoting this space to articles based upon the observations received currently or in recent years. We should be glad to receive comments from our members about this prospective plan. For the satisfaction of seeing their daily observations in print they could then substitute the gratifying knowledge that the observations sent in to us were being used more effectively for the advancement of the science. The annual report of the Society in any case constitutes a record of the activity of those to whom we are indebted for the results of the research.

Name and Station	1932	Began	End.	Tot.	Met.	F.	Rate	C.R.	Rem.
Alpha Nu Fraternity, Beta	Aug. 10	11:45	14:02	137	20	0.7	8.8	12.6	
Chapter, Denver, Colo.		12:27	14:00	93	76	0.7	49.0	70.0	1
		12:27	14:10	103	77	0.7	44.8	64.0	2
S. R. Baker, York, Pa.	July 27	8:20	9:45	85	2	0.8	1.4	1.8	3
	28	9:30	11:05	95	9	0.7	5.7	8.1	3
	29	10:09	11:21	72	6	1.0	5.0	5.0	3
	Aug. 9	11:45	12:35	50	11	0.7	13.2	18.9	3

Name and Station	1932	Began	End.	Tot.	Met.	F.	Rate	C.R.	Rem.
S. R. Baker, York, Pa.....	11	15:40	16:25	45	17	1.0	22.7	22.7	3,4
	12	13:19	16:19	180	57	1.0	19.0	19.0	3,4
	14	11:07	12:07	60	2	1.0	2.0	2.0	3,5
T. H. Bockhoff, 28° 10′ N, 89° 30′ W.	11	15:20	16:23	63	27	1.0	25.7	25.7	6
J. Brown, Pass Christian, Miss.	Aug. 10	14:00	14:30	30	22	1.0	44.0	44.0	
E. F. Bowman, Kansas City, Mo.	10	11:30	17:00	330	236	..	..	...	26
	10	11:00	16:00	300	516	..	..	...	26,32
H. A. Burns, Spring Valley, N. Y.	July 27	12:04	13:37	93	11	1.0	7.1	7.1	
	Aug. 8	11:05	12:40	95	13	0.8	8.2	10.2	
	9	10:11	14:13	242	48	0.7	11.9	17.0	
	11	10:27	14:00	213	59	1.0	16.6	16.6	
R. E. Clark, Northfield, Minn.	July 11	11:17	13:30	133	11	1.0	5.0	5.0	
	14	13:10	15:18	123	16	0.9	7.8	8.7	
	21	10:08	11:25	77	6	1.0	4.7	4.7	5
	24	10:15	11:17	62	10	0.7	9.7	13.9	5
	25	9:45	11:43	118	16	0.7	8.1	11.6	5
	26	10:20	12:00	100	20	1.0	12.0	12.0	
	30	9:45	12:37	172	41	0.7	14.3	20.4	
	Aug. 2	10:11	13:13	182	42	1.0	13.8	13.8	
T. D. Cope, Green Lane, Pa....	11	11:50	16:00	250	64	0.8	15.4	19.2	
F. B. Eason, East Point, Ga...	Aug. 10	10:30	15:00	270	198	1.0	44.0	44.0	3
	11	7:00	15:20	500	262	1.0	31.4	31.4	3
Mrs. W. H. Edwards, Fairhope, Alabama	10	12:50	14:50	120	93	0.8	46.5	58.1	7
	11	12:10	16:10	240	568	1.0	..	...	7,8
M. L. Evons, Yerkes, Pa.	11	13:00	16:00	180	54	0.9	18.0	20.0	
V. Francis, South Dartmouth, Mass.	July 31	8:30	10:40	130	15	1.0	6.9	6.9	
	Aug. 5	8:28	10:45	137	16	1.0	7.0	7.0	
J. H. Hett, New Haven, Conn..	11	9:02	15:34	392	169	1.0	25.9	25.9	3
E. Klapper and A. R. Klapper, Narberth, Pa.	11	12:00	17:00	300	217	0.8	..	...	7,24
A. S. Lawrence, Lynbrook, L. I., N. Y.	11	11:50	14:45	175	120	1.0	41.1	41.1	9
	12	10.40	12:15	95	15	0.9	9.5	10.6	5
F. F. Marsh, Frederick, Md. ..	July 28	11:45	12:45	60	6	0.5	6.0	12.0	
	Aug. 9	11:12	12:12	60	4	0.5	4.0	8.0	
	11	13:45	15:15	90	64	1.0	42.6	42.6	10
	12	15:25	16:10	45	8	1.0	10.7	10.7	
H. S. Martin, East Norwalk, Conn.	11	10:00	15:30	330	169	..	30.8	...	31
	12	15:45	17:15	90	56	..	37.3	...	7
E. P. Martz, Oak Park, Ill. ...	11	13:00	17:15	225	47	0.9	12.5	12.5	11
E. P. Martz, Fryeburg, Me. ...	29	8:00	9:00	60	5	0.9	5.0	5.6	
J. E. McKee, Bellville, O.....	July 29	14:07	15:07	60	8	1.0	8.0	8.0	
	Aug. 10	14:09	15:09	60	14	0.9	14.0	15.6	
R. T. Merkel, Topton, Pa.	11	11:00	16:00	300	94	0.9	18.8	20.9	12
R. W. Miller, Lansdowne, Pa..	11	13:30	15:00	90	38	1.0	25.3	25.3	
	12	14:10	15:30	80	33	1.0	24.8	24.8	
S. L. O'Byrne, Allenton, Mo. .	May 28	11:24	13:08	104	14	1.0	8.1	8.1	
Ranken, Mo.	June 11	13:50	15:03	73	7	0.8	5.8	7.2	
Webster Groves, Mo.	July 2	11:49	13:01	72	6	0.9	5.0	5.6	
	8	11:07	12:07	60	8	1.0	8.0	8.0	
Ranken, Mo.	27	12:35	14:40	125	36	1.0	17.3	17.3	
C. P. Olivier, Green Lane, Pa..	Aug. 11	11:46	16:00	254	104	0.8	24.6	30.8	4
G. W. Ridley—									
Mt. Hamilton, Calif.	Aug. 11	10:20	16:20	360	726	1.0	..	...	13
Mt. Diablo, Calif.	12	10:00	16:25	385	187	1.0	29.1	29.1	14
G. Rosengarten, Brookline, Pa..	11	14:15	16:01	106	90	1.0	50.9	50.9	30
A. Schenkman, New Market, New Jersey	11	13:28	15:28	120	16	?	8.0	...	
	19	8:37	9:37	60	5	1.0	5.0	5.0	
	21	7:45	8:55	70	6	1.0	5.1	5.1	
	Sept. 7	7:50	9:50	120	12	1.0	6.0	6.0	

Name and Station	1932	Began	End.	Tot.	Met.	F.	Rate	C.R.	Rem.
New Brunswick, N. J.	17	7:18	8:10	52	7	0.8	8.1	10.1	
New Market, N. J.	19	7:23	8:23	60	7	1.0	7.0	7.0	
	22	7:04	8:34	90	12	1.0	8.0	8.0	
	25	7:41	8:43	62	9	1.0	8.7	8.7	
W. F. Scudder, Wellsboro, Pa..	Mar. 9	8:30	9:30	60	9	0.9	9.0	10.0	
R. C. Shinkfield, Adelaide,	May 1	16:15	17:45	90	18	1.0	12.0	12.0	
South Australia	3	16:15	17:45	90	26	1.0	17.3	17.3	
	4	16:25	17:25	60	21	0.8	21.0	26.2	
	9	16:45	17:45	60	13	0.8	13.0	16.2	
	11	16:15	17:45	90	18	..	12.0	...	
F. W. Smith, Glenolden, Pa...	June 23	9:00	11:00	120	5	1.0	2.5	2.5	
	July 25	8:30	9:30	60	3	1.0	3.0	3.0	
	29	15:15	15:20	35	6	1.0	10.3	10.3	
	30	13:45	14:45	60	6	1.0	6.0	6.0	
	Aug. 5	9:00	10:00	60	2	1.0	2.0	2.0	
	9	13:20	14:50	90	10	1.0	6.7	6.7	
	11	12:00	16:00	240	61	0.8	15.2	19.0	
	13	14:40	15:50	70	13	1.0	11.1	11.1	
	25	12:20	16:05	225	17	1.0	4.5	4.5	
	Sept. 9	14:30	16:30	120	13	1.0	6.5	6.5	
T. Smith, Tucson, Arizona....	Aug. 27	9:47	12:00	133	20	0.9	9.0	10.0	
		12:30	14:00	90	22	1.0	14.7	14.7	
	28	8:14	15:00	337	72	1.0	12.8	12.8	
	29	8:09	16:37	318	73	1.0	13.8	23.8	
	31	8:18	13:40	170	63	..	22.2	...	
T. K. Tomkins, North Hills, Pa.	July 29	14:32	15:54	82	7	1.0	5.1	5.1	
	30	13:16	15:50	154	24	1.0	9.4	9.4	
	Aug. 5	13:53	15:47	114	14	0.9	7.4	8.2	
	9	11:09	12:35	86	8	0.7	5.6	8.0	
	11	12:50	15:50	180	40	1.0	13.3	13.3	
	13	12:45	15:08	143	18	1.0	7.6	7.6	5
Miss S. Urquhart—									
Fay Lake, Mich. .....June	4	11:05	13:35	150	19	1.0	7.6	7.6	
Detroit, Mich.	7	11:05	12:05	60	1	1.0	1.0	1.0	
	23	10:28	11:41	73	3	0.7	2.5	3.6	
	28	10:25	11:25	60	3	0.8	3.0	3.8	
Fay Lake, Mich. .....July	2	11:13	13:27	134	15	1.0	6.7	6.7	
Detroit, Mich.	4	10:44	11:44	60	3	0.7	3.0	4.3	
Fay Lake, Mich.	9	11:39	13:55	136	16	0.9	7.1	7.9	
	23	10:05	11:08	63	11	1.0	10.5	10.5	
Detroit, Mich.	27	10:21	11:45	84	12	0.7	8.6	12.3	
	28	10:39	11:46	67	11	0.7	9.9	14.1	
Fay Lake, Mich.	30	11:04	14:15	191	62	1.0	19.5	19.5	
	31	10:43	13:12	149	31	1.0	12.5	12.5	
	Aug. 3	11:18	14:30	192	43	1.0	13.4	13.4	
	5	10:38	14:21	223	53	0.9	14.3	15.9	
	7	10:05	12:43	146	34	1.0	14.0	14.0	
	8	15:18	16:18	60	25	1.0	25.0	25.0	4
	10	14:50	16:24	94	50	0.9	31.9	35.4	4
	11	13:01	15:01	120	104	1.0	52.0	52.0	15
		15:01	16:01	60	103	0.9	103.0	114.4	7
	12	15:27	15:57	30	33	0.9	66.0	73.3	7
W. P. Wamer, St. George, S.C..	Aug. 11	13:40	16:25	90	117	1.0	78.0	78.0	
Mrs. E. S. Wiegel,	9	15:00	16:00	60	11	0.6	11.0	18.3	
Elizabeth, Pa.	11	14:00	16:00	110	34	0.5	18.5	37.0	
R. H. Wilson, Upper Darby, Pa..	11	12:58	16:13	195	61	0.9	18.7	20.8	
J. B. Witherspoon,									
Weatherford, Texas	11	10:00	12:00	120	48	?	..	...	16

MICHIGAN GROUP.

Name and Station	1932	Began	End.	Tot.	Met.	F.	Rate	C.R.	Rem.
B. C. Darling, Pontiac.....	June 6	9:25	11:05	100	5	0.9	3.0	3.3	
	8	10:00	11:15	75	5	0.9	4.0	4.4	
	9	9:50	11:05	57	7	0.9	7.4	8.2	
Ann Arbor	10	10:00	11:00	60	5	1.0	5.0	5.0	
Pontiac	27	10:00	12:00	120	7	1.0	3.5	3.5	
	29	11:10	13:12	122	20	1.0	9.8	9.8	
C. B. Ford, Ann Arbor.....	Aug. 11	13:25	15:10	100	31	0.7	18.6	26.6	
W. J. Persons, Kalamazoo....	July 7	11:45	13:30	85	14	1.0	9.9	9.9	
	10	14:10	15:40	90	18	1.0	12.0	12.0	
	12	13:00	15:00	120	25	1.0	12.5	12.5	
	27	10:30	11:20	50	10	1.0	12.0	12.0	
	28	9:30	12:00	150	26	0.9	10.4	11.6	
	Aug. 4	10:30	12:00	90	13	0.6	8.7	14.5	
	7	14:17	16:17	120	39	1.0	19.5	19.5	
	10	14:53	15:53	60	86	0.9	86.0	95.6	17
		14:53	15:53	60	77	0.8	77.0	96.2	18
	11	14:22	16:00	90	157	0.9	104.7	116.3	19
		14:22	16:00	90	145	0.9	96.7	107.4	20
	12	14:50	15:55	60	64	1.0	64.0	64.0	21
		14:50	15:55	60	85	1.0	85.0	85.0	22
	30	13:55	16:55	180	49	1.0	16.3	16.3	4

MISSOURI GROUP.

Name and Station	1932	Began	End.	Tot.	Met.	F.	Rate	C.R.	Rem.
J. W. Simpson, Webster	July 24	11:35	12:35	60	8	0.7	8.0	11.4	
Groves	27	11:00	15:25	250	49	0.8	11.8	14.8	
	28	10:45	15:10	195	37	0.7	11.4	16.3	
	Aug. 5	12:00	13:00	60	10	0.6	10.0	16.7	
	9	13:20	15:40	135	43	0.7	19.1	27.3	
	10	11:55	16:00	180	91	0.5	30.3	60.6	
	22	10:00	11:00	60	5	0.8	5.0	6.2	5
	29	10:55	14:40	100	19	0.8	11.4	14.2	
A. M. Simpson, Webster	July 24	11:35	12:35	60	6	0.7	6.0	8.6	
Groves	27	11:50	15:25	215	35	0.8	9.8	12.2	
	28	12:00	15:00	180	29	0.7	9.7	13.8	
	Aug. 9	13:20	15:55	155	58	0.7	22.4	32.0	
	10	12:00	16:00	180	112	0.5	37.3	74.6	
	22	9:45	10:45	60	5	0.8	5.0	6.2	
	29	10:55	14:40	100	27	0.8	16.2	20.2	
J. F. Hickerson, Webster	July 24	11:35	12:35	60	7	0.7	7.0	10.0	
Groves	27	12:00	15:01	181	30	0.8	10.0	12.5	
	28	12:00	15:10	190	42	0.7	13.3	19.0	
	Aug. 10	11:55	14:25	150	61	0.5	24.4	48.8	
H. C. Crow, Grand Tower, Ill.	July 27	10:30	14:15	205	19	..	5.6	...	23
	Aug. 12	9:00	15:58	418	87	..	12.5	...	23
V. Carter, Webster Groves....	July 27	11:30	12:30	60	18	0.8	..	...	23,24
J. Pagen, Buckner, Ill.....	July 28	9:45	12:45	165	100	..	36.4	...	23
	Aug. 10	10:00	11:00	60	13	..	13.0	...	23
E. E. Friton, St. Louis, Mo...	July 28	10:15	13:00	165	13	0.5	4.7	9.4	23
	Aug. 10	11:00	13:15	135	28	0.6	12.4	20.7	23
J. W. Belts, Little Rock, Ark.	Aug. 11	11:00	13:00	120	25	..	12.5	...	23
Mrs. B. H. Blanton, Bismark, Missouri	10	13:50	14:50	60	32	..	32.0	...	23
Miss M. Blanton, Bismark, Mo.	10	10:00	11:00	60	25	..	..	...	23,25
	11	12:30	14:30	120	156	..	..	...	23,24
Miss G. E. Bowman, Bonne Terre, Mo.	11	12:55	13:55	60	76	..	..	...	23,24
G. Fritz, Little Rock, Ark.....	11	11:15	12:15	60	32	..	32.0	...	23

Name and Station	1932	Began	End.	Tot.	Met.	F.	Rate	C.R.	Rem.
H. T. Gates, Webster Groves..	11	12:30	13:30	60	7	0.6	7.0	11.7	23
C. F. Hennrich, Farmington...	11	13:00	14:00	60	292	..	..	...	23,26
Miss B. Muffley, Ironton, Mo..	11	14:20	16:00	100	108	..	64.8	...	23
Mrs. R. J. Reeder, Flat River.	11	13:10	15:45	155	478	..	..	...	23,26
E. N. Schunz, Webster Groves.	11	10:30	12:30	120	23	0.6	11.5	19.2	23
Mrs. W. E. Van Sickle, Fredericktown, Mo.	11	13:40	14:30	50	79	..	..	...	23,25

OREGON GROUP.

Name and Station	1932	Began	End.	Tot.	Met.	F.	Rate	C.R.	Rem.
G. M. Bugarr, Eugene .....Aug.	12	10:30	11:30	60	15	1.0	15.0	15.0	7
Miss P. Reburn, McMinnville.	12	13:45	15:00	75	26	..	20.8	...	7

WEBSTER GROVES VOLUNTEER GROUP.

Name and Station	1932	Began	End.	Tot.	Met.	F.	Rate	C.R.	Rem.
S. L. O'Byrne .....Aug.	2	10:30	11:30	60	29	1.0	29.0	29.0	
Santa Fe, New Mexico—									
Miss C. Heising.....	11	14:15	15:15	60	114	1.0	114.0	114.0	7
Miss N. Matlock	11	14:15	15:15	60	114	1.0	114.0	114.0	7
Miss E. Nau.....	12	14:45	15:45	60	39	1.0	39.0	39.0	7,33
Miss E. Bacon.....	12	14:45	15:45	60	39	1.0	39.0	39.0	7,34

NON-MEMBERS.

Name and Station	1932	Began	End.	Tot.	Met.	F.	Rate	C.R.	Rem.
H. Grubb, Pomeroy, Pa. .....Aug.	4	9:45	11:45	120	33	..	16.5	...	7
Douglas Hill, Maine—									
F. Herzegh, L. Henyeh.....	11	12:00	14:00	120	186	..	..	...	7,24
F. G. Rhodes, Great Neck, L.I.	11	11:40	13:40	120	53	..	26.5	...	7
C. Weber, Zanesville, O.	8	10:20	11:20	60	6	..	6.0	...	7
E. E. Wheeler, Birmingham, Alabama	9	13:00	15:00	110	39	..	21.3	...	7
	10	9:30	16:00	270	280	..	..	...	7,27
J. H. Clark, St. George, S. C..	11	14:40	16:25	60	53	1.0	53.0	53.0	7
G. F. Leydorf, Columbus, O...	11	13:00	14:30	210	32	1.0	9.1	9.1	28
D. Faulkner, Columbus, O....	11	12:00	17:00	300	21	?	4.2	?	29
C. E. Buell, Columbus, O.....	12	13:41	16:30	169	16	1.0	5.7	5.7	29
A. S. Otis, Yonkers, N. Y.	11	12:30	14:00	90	53	..	..	...	26

REMARKS.

1. Observer, G. Wagner. Count. N.E.
2. Observer, I. Olcott. Count. East.
3. Count, notes on each.
4. Dawn at end.
5. Moon.
6. In addition, at least three times this number seen.
7. Count.
8. Five observers covering sky.
9. Thirty-eight plotted.
10. Thirty-two plotted.
11. Thirty-three plotted.
12. Path records for seven.
13. Ninety-one plotted. Covered east half of sky; 2 helpers; moon.
14. 106 plotted.
15. 77 plotted.
16. Four observers.
17. Count;faced N.E. Assistant observers, J. Hill, J. Miles. Time divided among 3; rate therefore correct for individual.
18. Same as 17, but faced S.W.
19. Count; faced N.E. Asst. observer, Mrs. H. E. Persons for first and third half-hours.
20. Count; faced S.W. Assistant observer, Mrs. H. E. Persons for middle half-hour.
21. Count; faced N.E. Asst. observer, Mrs. H. A. Persons for second half hour.
22. Count; faced S.W. Asst. observer, Mrs. H. E. Persons for first half hour.
23. Probably count.
24. Two observers.
25. Three observers.
26. Group of observers.
27. Count. 3 observers with assigned sectors of sky: E. E. Wheeler, W. A. Bagley, G. W. Bagley.
28. Plotted. Twice as many seen.
29. Plotted.

30. Ten plotted.
31. Largely count.
32. Station 7 miles outside of city.
33. Cloudy in N.E. Observed N.W.
34. Cloudy in N.E. Observed S.W.

1932 October 15, Flower Observatory, Upper Darby, Pennsylvania.

The Iowa Program for the 1932 Leonids

By C. C. WYLIE

Arizona. To escape the cloudy and rainy weather prevalent in the middle west in November, a party of four will go to Arizona for the period of the Leonid maximum. Observers are R. E. Crilley, Thomas C. Poulter, and C. C. Wylie. Ray Anderson will accompany the party as photographer. Reticles similar to those used at the Perseid maximum will be set up at two stations, perhaps Flagstaff and Canyon Diablo. Observations from the two stations will determine the real path through the atmosphere for meteors observed simultaneously. A third reticle, equatorially mounted and directed toward Leo, will be used to determine the radiant from night to night. Mr. A. King, of England, has communicated an ephemeris of the Leonid radiant, for the period November 14 to November 20, with the request that observations be made to verify it. Cameras will be set up at each of the stations, one equipped with a rotating sector so that the velocity will be determined for any meteors observed simultaneously with the cameras.

Iowa City, Iowa, and *Mt. Pleasant, Iowa.* Two reticles at Iowa City, and two at Mt. Pleasant, will be used for simultaneous observations from the two stations. It is hoped that duplicate observations will be obtained at each station for many, if not most, meteors observed simultaneously. A third reticle at each station, equatorially mounted and directed toward Leo, will be used for determining the radiant from night to night. The observations at Iowa City will be made by students of the University of Iowa, and the observations at Mt. Pleasant will be made by students of Iowa Wesleyan.

Dubuque, Iowa. Students of Columbia College, under the direction of Father J. A. Theobald, will make systematic counts, both group and solo, of the number of Leonids appearing near the date of expected maximum. The systematic counts made at Dubuque have in the past proved very useful for determining the change from night to night, and for fixing the approximate hour of maximum. Father Theobald has also considered the advisability of setting up reticles in or near Dubuque. From previous experience, we believe that the distance from Iowa City to Dubuque is too great for the best simultaneous work; but the possibility of establishing two stations near Dubuque, and manning both with Columbia College students on important nights is being considered.

University of Iowa, October 22, 1932.

Meteor Explodes.—A meteor, shooting through the sky leaving a trail of white smoke behind, then exploding like a box of dynamite! Such was the unusual spectacle viewed by Paul Michell and Mildred Johnson Wednesday morning while they were working at the George Johnson place, according to Alvin Weymouth. The meteor made its appearance at about 11:15. It was seen by a number of people at Omak, Okanogan, and surrounding country.

Some of those who saw the meteor believed it struck the earth in the neighborhood of Omak Lake.—*The Omak Chronicle,* Omak, Washington, September 27, 1932.

Perseids Observed in Berea, Ohio

The display of "Shooting Stars" from the direction of Perseus was more than interesting the last two evenings. From 10:30 P.M. to 2:00 A.M. last night 265 were recorded. During the same period the night before 110 Perseids were observed from the north campus of Baldwin-Wallace College, Berea, Ohio.

August 12, 1932. O. L. DUSTHEIMER.

Comet Notes

By G. VAN BIESBROECK

During the last month there have been no further additions to the already long list of comets found this year. Six of these are still under observation in northern stations but none is bright enough for being watched with a small instrument.

In the evening sky COMET 1932*e* (PERIODIC KOPFF) moves slowly eastward in the constellation of Sagittarius. When last seen here on October 19 it was recorded as a round coma about 2′ in diameter, of total brightness 13^{M}.5. Kepinsky's ephemeris which is quite accurate continues as follows:

1932 0^h U.T.	α h m s	δ ° ′ ″	r	Δ
Nov. 4	19 28 42.2	14 39 5	1.829	1.905
8	38 50.0	14 14 5		
12	48 53.2	13 47 18	1.858	1.998
16	19 58 51.6	13 18 47		
20	20 8 44.8	12 48 36	1.889	2.094
24	18 32.3	12 16 50		
28	28 14.2	11 43 31	1.922	2.193
Dec. 2	37 50.1	11 8 44		
6	20 47 19.6	10 32 35	1.957	2.293

It is not probable that observations will be possible after the last date since the increasing distances will reduce the brightness appreciably.

COMET 1932*f* (NEWMAN) is also an evening object, moving northeastward in the constellation of Hercules. On October 19 the total brightness was estimated here as 13^{M}; the coma had become quite large and diffuse. I have computed the following continuation of the ephemeris (p. 494) based on the parabolic orbit by Whipple and Cunningham:

1932 0^h U.T.	α h m	δ ° ′	r	Δ
Nov. 1	16 47.3	+43 41	1.72	1.86
5	59.8	44 40		
9	17 13.3	45 39	1.76	1.84
13	27.9	46 38		
17	43.5	47 36	1.80	1.82
21	18 0.3	48 33		
25	18.2	49 26	1.84	1.80
29	37.3	50 14		
Dec. 3	18 57.4	+50 57	1.89	1.80

The distance from the earth is minimum at the end of the month but the brightness decreases because the comet has been moving away from the sun since the end of September.

COMET 1932 *h* (PELTIER-WHIPPLE) has been well observed during the months of August and September but in October it had lost so much in brightness that it was beyond reach of ordinary instruments. When last observed by the writer (October 12) near Eta Ursa Majoris the total brightness was reduced to 11^{M}.5; the tail was still visible over one-third of a degree but the nucleus had become very diffuse. Conjunction with the sun occurs on October 30; after that date the comet is best observed in the morning sky in the constellation of Bootes.

The deviation of the orbit from a parabola has become more and more definite. From an arc extending from August 6 to September 8 A. D. Maxwell (Ann Arbor) has deduced the following elements which are quite close to those by H. Jensen (Copenhagen) based on observations covering the interval August 10 to September 9:

	MAXWELL	JENSEN
Perihelion	1932 Sept. 1.86615	Sept. 1.86128
Perihelion to node	38° 28′ 46″.0	38° 28′ 31″.5
Longitude of node	344 30 33.9	344 30 35.4
Inclination	71 42 36.8	71 42 32.6
Perihelion distance	1.037155	1.037175
Eccentricity	0.9758675	0.976172
Period in years	282	288

These elements have no similarity with those of comets seen in the past and there is no record of any bright comet in the middle of the seventeenth century that could correspond to a previous apparition.

The following ephemeris, deduced from the first set of elements and kindly supplied by A. D. Maxwell, shows the further course of the comet. The rapidly increasing distances will soon put an end to the visibility.

1932 0^{h} U.T.	α h m s	δ ° ′	r	Δ
Nov. 1	14 16 40	+45 52.3	1.421	1.624
5	19 02	45 13.3		
9	21 13	44 41.5	1.507	1.693
13	23 10	44 16.7		
17	24 55	43 58.7	1.595	1.748
21	26 26	43 47.2		
25	27 43	43 42.2	1.686	1.788
29	28 42	43 43.6		
Dec. 3	29 22	43 51.2	1.778	1.815
7	29 42	44 4.9		
11	29 37	44 24.6	1.871	1.831
15	29 08	44 50.3		
19	28 08	45 21.5	1.965	1.839
23	26 36	45 58.2		
Dec. 27	14 24 26	+46 40.2	2.058	1.841

The discoverer, L. C. Peltier, sends the following fine series of visual observations of brightness, which are based on comparison stars in fields of variable-stars which were at about the same height above the horizon as the comet:

U.T.	Mg.
Aug. 11.44	7.0
12.37	7.0
13.42	6.9
14.44	6.9
18.33	6.9
26.25	6.8
31.08	6.8

U.T.	Mg.
Sept. 4.08	6.7
6.08	6.7
7.17	6.7
10.37	6.6

For the nucleus he gives $8^{M}.2$ (August 8) and $8^{M}.1$ (August 11) and reports that on September 24 the total brightness had dropped to $8^{M}.6$.

In the middle of the night COMETS 1932*l* (PERIODIC FAYE) and 1932*m* (PERIODIC BROOKS), both in the region of the vernal equinox, are very well placed for observation but they are faint. On September 28 the former was found here to be of 11th magnitude; most of the light was concentrated in a small but not stellar nucleus and a tail 10′ long could be seen on the following side. On that same night Comet Brooks was appreciably the fainter of the two. The magnitude was estimated as $12^{M}.5$ and the comet also showed a little tail on the following side. The following continuation of the ephemerides shows that for some time these two comets will remain quite close together in the constellation of Cetus.

1932	Comet 1932*l* (Faye)		Comet 1932*m* (Brooks)	
0^{h} U.T.	h m	° ′	h m	° ′
Nov. 5	0 31.0	+2 33	0 38.8	−1 15
13	36.2	+1 8	41.1	−1 22
21	43.8	+0 8	45.3	−1 10
29	0 53.5	−0 24	51.0	−0 43
Dec. 7	1 4.9	−0 32	0 58.2	−0 1
15	17.9	−0 17	1 6.9	+0 51
23	32.1	+0 15	16.6	+1 53
31	47.7	+1 4	1 27.4	+3 1

At the end of November they will remain within one degree of each other for several days.

In the morning sky COMET 1932*k* (PERIODIC BORRELLY) has slowly increased in brightness as expected. When last seen here on October 11 the magnitude was recorded as 11th.

Exposures made by the writer with a wide-angle Ross lens on October 3 and 6 do not reveal the presence of COMET 1866 I (TEMPEL), related to the Leonid meteors which are expected in a few days. The plates were centered on the place indicated by Crommelin (see p. 494). The search for this interesting comet should be continued over a wider area.

Williams Bay, Wisconsin, October 21, 1932.

Notes from Amateurs

Amateurs Visit Perkins Observatory

At the June meeting of the Pittsburgh Amateurs, it was suggested that we dispense with an indoor meeting during July, and instead arrange a visit to the Perkins Observatory, at Delaware, Ohio, about 200 miles distant. Accordingly, a committee was appointed, and through the courtesy of the Director, Dr. Harlan T. Stetson, arrangements to visit the Observatory were made for July 16, near the time of Full Moon, as this would least conflict with the working schedule of the Observatory.

Invitations to amateurs residing in Chicago, Cleveland, Columbus, Lorain, Crestline, Dayton, Akron, and Indianapolis were sent by the Pittsburgh group, and were accepted unanimously. From thirty to forty amateurs gathered at Delaware, Ohio, the afternoon and evening of the 16th, and were affably greeted by

Dr. Stetson and his assistant, Mr. Cobb, both of whom did all in their power to make us feel at home. Following an afternoon visit to the library, machine shop, radio laboratory, and offices, and after witnessing various demonstrations in the laboratory, the groups assembled in the big dome for their first view of the large reflector, the recently completed 69-inch Cassegrain. It was like renewing the acquaintance of a seldom seen friend for the Pittsburghers to gaze down the dural skeleton tube and see the completed mirror that they had first seen as a rough disc of glass in the shops of Mr. Fecker in Pittsburgh, and, later at their convention last year, saw under the knife edge test in the testing tunnel of the same building.

Amateurs carrying cameras on the trip were busy clicking shutters, endeavoring to secure odd and interesting views of the telescope and its driving clock. Those not so equipped were more than pleased with the post card views on sale in the lobby at a nominal cost.

After an informal meeting in the lecture room, the groups returned to Delaware for dinner, and, as darkness fell and the sun sank behind a rosy bank of clouds in the distance, re-assembled under the clear Ohio skies on the observing platform of the 69-inch for their first sight through the Cassegrain, at the 104-foot focal point. Vega, almost directly overhead, was selected, and proved so brilliant that a beam of light emerging from the eyepiece could be projected several feet, falling as a bright blue disc on the observing chair. The tenth magnitude companion of Vega was like a first magnitude star seen in amateur instruments, and in addition another fainter star formed with the two mentioned an isosceles triangle, filling the field. Dr. Stetson estimated that visually the telescope would reach the 17th magnitude, depending upon the seeing.

The ever-beautiful Albireo was next chosen, in preference to the Ring Nebula, as the full moonlight would serve to pale the latter object. After all had beheld these jewels of the sky, the diamond studded field of the Great Cluster in Hercules was next enjoyed. This object, viewed under three hundred power, more than filled the field, only the central portion being contained in the Cassegrain field of view. However, the object, or what was purported to be the entire cluster, was announced by Scanlon of the Pittsburgh group, as being an even better sight in the finder than in the 69-inch. Incredible as it sounded, examination by the amateurs present found it to be true, until it was announced by those responsible that a good-natured fraud was being perpetrated upon them by the Pittsburgh group, who had come prepared for bad weather, armed with a special eyepiece, in which was imprisoned a permanent Hercules Cluster, with motions. It consisted of a spinthariscope, designed to illustrate radium-activity, and, after all had enjoyed the synthetic cluster, it was passed around for inspection.

The next object viewed was Saturn. Viewed under 300 power, with plenty of light back of it, this was a satisfying sight, though the quality of the "seeing" was not up to average. After all had feasted their eyes on this familiar sight, a touch of a button moved the telescope to the moon, where it was seen brightly shining in the southeast. Being near the Full stage, only the craters near the limb were examined.

By this time midnight had long since come and gone, and a tired but happy group of amateurs tried inadequately to express their sincere gratitude to Dr. Stetson and Mr. Cobb for their courteous and patient treatment of our group, with the expressed wish of returning again.

The Chicago group was lead by W. S. Buttles, Publicity director of the

A.T.M.O.C. Indianapolis was in charge of V. E. Mair, the Secretary, while the delegation from Lorain was lead by Mason.

LEO J. SCANLON, *Secretary.*

Valley View Observatory, Pittsburgh, Pennsylvania.

Amateur Telescope Makers of Chicago

The group of Amateur Telescope Makers of Chicago has been operating for the past several months as a round table with a minimum of formality and organization.

Some of the members have desired a change to a formal type of organization. This change has now been made and beginning with November Professor Arthur Howe Carpenter of Armour Institute of Technology will be inaugurated as President with Wm. Callum continuing as Secretary. Letters to the A.T.M.O.C. should be addressed to him at 1319 W. 78th Street, Chicago.

The publication of the "Astroscope" has been turned over to the former Publicity Chairman, and future issues of the "Astroscope" will come from an organization yet in a nebulous state. This group will probably function under the name "Astrolab,"—national in scope, clubs as well as individuals. The staff will consist of several A.T.M.s interested in standardization,—developing the most convenient easily built telescope at the minimum outlay of time and money. The ultimate purpose, therefore, is to provide means for the coördination of amateur effort.

Some details of their program are: The standardization of portable telescopes. The polar axis can be either portable or permanently mounted or both, the bearing to be 4 inches long, cone of 10° taper. It is hoped that many amateurs will adopt this interchangeable bearing design so that telescopes can be taken from one location to another and used on the mountings of other A.T.M.s who have adopted the same design. This convenience should accelerate coöperative telescope making. The fork mounting total weight for a 6-inch or 8-inch telescope complete except for polar axis will be only 15 to 30 pounds, making it easily portable.

Kits for simple telescopes suitable for new A.T.M.s, boy scouts or high school students will be made available. These will contain lenses for a ¾-inch Kellner eyepiece, small prism, mirror blank fine ground to standard focus, and materials for finishing.

Correspondence is invited by the staff of the "Astroscope."

L. I. BUTTLES.

10728 S. Artesian Avenue, Chicago, Illinois, October 14, 1932.

Amateur Astronomers' National Convention?

The ever-growing interest in amateur astronomy and the great increase in the number of enthusiasts now building their own telescopes throughout the country lead the writer to believe that the time is at hand to crystallize such interest and give added impetus to the movement through the medium of a National Convention of Amateur Astronomers and Telescope Makers.

The unfailing success of the gatherings yearly at Stellafane, Springfield, Vermont, under the auspices of the Telescope Makers of Springfield, and the surprisingly enthusiastic assembly of amateurs at Pittsburgh last year indicate that a similar gathering of larger scope, conducted in a centrally located city during the coming year would not be amiss. We believe Chicago, with its well organized Amateur Telescope Makers group there, could well sponsor such an undertaking. They would have as stellar attractions the Adler Planetarium, the World's Fair,

the Field Museum, and others too numerous to mention.

We would like to have various societies interested in such an event comment upon its feasibility, and discuss a program which they would like to see. Amateur Telescope Makers, either singly or in groups, can communicate with the writer, or with the Chicago group, through the Adler Planetarium. We would particularly like to hear from Chicago on this subject.

LEO J. SCANLON.

Valley View Observatory, Pittsburgh, Pennsylvania.

Computing Time of Setting of Planets

At my observatory in Duluth there is higher ground to the west, some 3 to 7 degrees above the level, so that celestial objects set earlier by half an hour, more or less. In fixing the hours for public visitors when I wish to show planets near the sun, like Mercury and Venus, and other planets when approaching conjunction, I find it important to know just when they may be expected to set.

Some years ago—in 1925—I set about it and measured, by the hour circle of my telescope, the hour-angle of the visible horizon for every degree of declination from —31° to +47°. These were tabulated. Now, to find when a planet sets it is only necessary to take from the table the hour angle for the planet's declination and add it to the time of transit as given in the *Ephemeris*. This gives the local mean time of setting. For Standard Time, eight minutes are added for the westing of the observatory from the 90th meridian.

For finding the time of setting of a star or comet it is first necessary to find its time of transit, or upper culmination, which may be done by adding the right ascension of the star to the "Civil Time of Sidereal 0^h" as given in the *Ephemeris* table of the sun. Then the tabular hour angle is added, to give the time of setting, the same as for a planet. For accuracy the R.A. (right ascension) of the star should be given a small minus correction for changing from Sidereal to Mean Time. This correction does not exceed 4 minutes.

The foregoing relates to setting at the visible horizon. I also computed the hour angle of setting for the true horizon, in order to readily give the time of setting of planets for the general public, who are supposed to be living in a level country. These hour angles for the true horizon are also used for the time of rising of planets at the observatory, as the eastern horizon is practically level.

A few details will be added for the benefit of those who may wish to prepare such a table. First I found that it facilitated the operation to plat the measured hour-angles on cross-section paper, as will later appear. The paper was divided to tenths of an inch, each way, and one tenth was used for 1 degree of declination, and one tenth for 4 minutes of time.

For getting the true horizon hour-angles some computing was done, together with platting. I had the planet's declination from the *Ephemeris*, the latitude of the observatory, 46° 47′, and the refraction at horizon of about 34′, so that the zenith distance of the planet at setting is 90° 34′. Then by a standard formula* I computed the hour-angle for every ten degrees of declination. These hour-angles were given the small correction for sidereal acceleration by Table II of the *Ephemeris*, and platted on the cross section sheet, and a smooth curve was drawn through the points. The hour-angle for each degree was read off from this curve.

For the visible horizon, the measured HA's, when corrected for sidereal ac-

*Campbell's "Elements of Practical Astronomy," p. 12, formula (39), or "Young's General Astronomy," Articles 130 and 116.

celeration, were platted for each degree, in a series of dots. Then for refraction the altitude of each dot was scaled off perpendicular from the horizon curve and diminished by the 34′ that the curve is really below the true horizon. The mean refraction for this altitude was laid off downward from the dot and perpendicular to the horizon curve, and a line drawn through these corrected points. This line or curve, which for convience I call the "visible horizon," represents the true altitude of the setting planets and stars. The hour-angle for each degree of declination was read off from this curve.

For some years I used these curves directly for taking off the hour-angle of a planet's setting, but later tabulated the angles for greater convenience. No correction has been made for collimation error of the telescope or for index error of the hour-circle, as might have been done and perhaps should have been done, but I simply assumed them as negligible. Comparison of observed with computed times of setting has shown a satisfactory agreement.

Approximate values for the hour-angles to the visible horizon or sky-line, for finding the times of setting of planets could be obtained by omitting the corrections for refraction and sidereal intervals, and simply measuring and tabulating the hour-angles. These errors together probably would not exceed 2 or 3 minutes. The two errors apply in opposite directions and so partially offset each other.

If the telescope tube, or any portion of it, is parallel to the line of sight, the hour-angle to the true horizon can be approximately measured directly by setting the telescope to the desired declination and bringing it to a horizontal position by means of an ordinary carpenter's level placed upon the tube, and reading the hour-circle. I tried this method with my telescope for a check on my computed hour-angles, and found it gave fairly precise results. The two corrections, for refraction and sidereal interval, together averaged less than 1^m for declinations from 0 to $+30°$, about $+2^m$ from $-10°$ to $-30°$, $+5^m$ for $-40°$, and $+3^m$ for $+40°$. This method avoids computations and platting.

Hour-angles to the true horizon can also be roughly taken from a celestial globe that is marked with hour-circles and declination parallels and is provided with a meridian and horizon. See that the angle of the north pole above the horizon is equal to the latitude of the station. Mark the declination of the planet or star on the zero hour-circle, and then the right ascension of the meridian is the hour-angle for the setting of that planet. It is not worth while to consider the corrections which have been mentioned, on account of the greater inaccuracies of the globe itself.

J. H. Darling.

Duluth, Minnesota, August 5, 1932.

General Notes

Dr. Jan H. Oort, lecturer and observer of the University of Leiden, arrived in Delaware on October 4 to begin extensive photometric studies of nebulae in a coöperative plan with the Perkins Observatory of Ohio Wesleyan University.

At the Perkins Observatory Dr. Oort is giving a special series of lectures on Stellar Statistics on Thursday afternoons. The dates and titles of the lectures are as follows: October 13, The observational data; October 20, Methods for determining stellar distributions; October 27, General structure of the system of stars; November 3, Stellar motions; November 10, Stellar dynamics I; November

17, Stellar dynamics II. Galactic rotation. The lectures and discussions are open to all interested.

Professor Edwin B. Frost, who recently underwent a critical operation at the Billings Hospital, Chicago, is making satisfactory progress toward recovery, according to a report received on October 26. Professor Frost's numerous friends will rejoice in this and in the additional information that, according to the prediction of his physicians, his health will now be better than it has been for some years.

Dr. Knut Lundmark, director of the Lund (Sweden) Observatory, and Mrs. Lundmark are spending several months in this country. They attended the meetings of the International Astronomical Union in Cambridge in September. After spending a few weeks at the Harvard Observatory they went to the Lick Observatory where they will remain until the end of the year. They will visit other observatories before returning to Lund.

Dr. Lundmark is gathering data for inclusion in the new general catalouge of nebulae, L.G.C., (Lund General Catalogue) which he is preparing.

David Dunlap Observatory.—This new observatory is now under construction near Toronto and will form a part of the University of Toronto. On September 10 the corner-stone of the administration building was laid, the President of the University, the Chairman of the Board of Governors, the Chancellor of the University, the Minister of Education, the Director of the Observatory, and others participating in the ceremony. A 72-inch reflecting telescope is now being made and will form the principal instrument of this observatory.

The Chicago Astronomical Society

The October meeting of the Chicago Astronomical Society was held on Thursday, October 13, 1932, at the Adler Planetarium and Astronomical Museum at 7:30 in the evening. This was a joint meeting with the Physics Club of Chicago.

The program was devoted to eclipse problems. I. A demonstration of the phenomenon, using the planetarium and auxiliary apparatus and a report on the Island Pond, Vermont, Expedition of the Planetarium, the Society, and associated observatories, by the Director. II. "Timing an Eclipse" by Mr. F. D. Urie, Superintendent of Research and Inspection of the Elgin National Watch Company. III. Stills and Motion Pictures of the Eclipse as seen at Kennebunk, Maine, by Mr. A. Herz, Chief Testing Engineer, Public Service Company.

The November meeting of the Chicago Astronomical Society will be held at the Adler Planetarium and Astronomical Museum on Thursday evening, November 17, 1932. A program will be presented by Professor Otto Struve and Professor C. T. Elvey of the Yerkes Observatory, who will discuss the coöperative program between Yerkes Observatory and the University of Texas. Dr. Struve will present the outline of the project as a whole and Dr. Elvey will report on the expedition for the examination of various sites.

Eclipse Observed in Quebec

Three of us, Reverend G. W. Walker and two members of the A.A.V.S.O., Mr. A. L. Wallon and myself, drove from Montreal to a point about 1½ miles southwest of Sorel, Quebec. A quick move ten minutes before totality brought the sun out from a thin cloud, and Baily's Beads, the diamond ring, and the inner

corona were perfectly observed with the naked eye. Through a 2-inch telescope the streamers were visible, the longer triangular one fully 50′ long. Field glasses and a 12-power monocular were also used. We observed no color in the corona, and made out no prominences.

I read in a newspaper that there was an expedition northeast of us, across the river, at Louisville, which had good results. Except for this, I have seen no report of success in Quebec.

CASPAR R. GREGORY.

The Aurora of May 29, 1932, apparently was visible over practically all of the northern part of North America.

The remarkable thing about it was that the northern part of the sky seemed entirely clear while the rest of the sky was in a great turmoil.

For a short time an arc was formed and instead of being a few degrees from the north, as is usual, it seemed to be shifted about 30° towards the east.

Possibly some one can tell me if this was caused by a shifting of the earth's magnetic field. I do not remember having seen anything similar, as the usual type is streamers which reach only to the zenith and mainly restricted to the northern portions of the sky. Probably some one else observed this also and will give an account of his observations in POPULAR ASTRONOMY.

G. MCFARLANE.

490 Cooper Street, Ottawa.

The Godfrey Astronomical Club of Watertown, Wisconsin

The annual meeting of the Godfrey Club was held Sunday evening, October 9, at the Watertown Elks Club rooms with an attendance of twenty. Herbert Kesting spoke on the significance of Purbach in the history of Astronomy illustrating his talk with extracts from his translation of Purbach's writings concerning the planets. Edward Kuenzi gave a talk on the making of a 4-inch reflector. The program was concluded with an illustrated lecture on Astronomy by Mr. R. N. Buckstaff of Oshkosh, Wisconsin.

Among the out-of-town visitors at the meeting was a representative of the newly organized Milwaukee Astronomical Association. The Godfrey Club report for the past year showed a total of 260 observations of variable stars by six observers. Plans were made to attend the meeting of the Midwestern Group of the A.A.V.S.O. to be held at the Yerkes Observatory October 16.

A Brilliant Meteor

Sr. Thomas M. Olivera, of Buenos Aires, reports the observation of a meteor, somewhat superior to Venus in brilliancy, seen on April 24 at $19^h\ 3^m$. The meteor appeared in the constellation of Gemini at R.A. $6^h\ 39^m$, Decl. $+29°$ (1860), and disappeared about a second later almost without change of position. Its color when first seen was light bluish changing later to orange. A trail about twice the size of the meteor was left and remained visible for 2 seconds. This observation was made at Long. $+58°\ 21'\ 30''$, Lat. $-34°\ 40'\ 7''$.

New Asteroid Discovered at La Plata

The observation of asteroids of considerable southern declination, not favorably situated for northern observatories, is part of the regular program of the La Plata Observatory. On a plate dated May 9, taken with the astrographic telescope for the purpose of finding the Planetoid Jucunda (948), I discovered, besides this object, a new body which my later observations during succeeding days

show to be also an asteroid, even somewhat brighter than the former. The position of the new body as of May 9 at 20:21.2 was: R.A. $14^h\ 2^m\ 31^s.86$, Decl. $-22°\ 49'\ 7''.3$ (1925.0) and its magnitude approximately 13. I am continuing observations to obtain positions over the greatest possible arc in order to be able to determine the orbit with accuracy.

JUAN. HARTMANN.

[From *Revista Astronomica* for May-June, 1932.]

Northern Lights Display of July 16, 1932

At 12:45 A.M., the glow of the aurora borealis extended in an arch 2° wide across the sky from the northwest to the northeast (90° of horizon). The maximum height was in Auriga (Capella being in the center of the band).

Dart-like regions appeared in brilliant definition and with great brightness (magnitude 2). At 12:51 the display had faded to a dull grayness with a less perfect arch and a broader diffuse band. Directly in the north three circular regions approximately the size of the moon appeared at 12:52. At 12:59 three flashes of light appeared followed by a rejuvenation of the eastern half of the arch. A long ribbon of light dropped down from Capella for a distance of 10°. Close by a glow four times the diameter of the moon appeared with great brilliance and faded in 19 seconds. At 1:04 the narrow arch was replaced by long draperies which reached a height of 25° (length of big dipper).

A pillar of the glow extended up to cover γ and δ Ursae Majoris at 1:08. In a minute and thirty-five seconds the patch had drifted to the center of the bowl of the dipper, a distance of 4½° (2°.8 per minute—rate of drift). Another patch drifted from δ to α in the time interval of 1:10:10 to 1:11:35 (rate 7°.2 per min). From Aries to the handle of the Dipper a band 20° in width appeared. This faded after 15 seconds. The display faded and later clouds covered the region (1:46).

R.E.C. (Goodsell Observatory.)

Book Reviews

The Nantucket Maria Mitchell Association.—The thirtieth annual report of this Association has recently been received. It consists of sixty pages giving an account of the activities of the various brances of this Association for the year. Of interest to astronomers is the reproduction of a plate showing the position of the planet Pluto on December 10, 1931.

The report of the Curator and Director of Natural Science also is illustrated by a number of very fine plates. The report concludes with a list of papers published and a list of life members of the Association.

New Zealand Astronomical Society.—The second annual report of the star color section of this society has recently been received. It consists of eight mimeographed pages, mostly tables giving results of observations, and two pages of charts. The director of this section. Mr. A. G. C. Crust, evidently is a very active and enthusiastic leader. The section is planning to extend the scope of its work in the near future.

The "Monthly Notes" for June of this society containing an interesting summary of astronomical progress in 1931, have been received also.

Publications of the University of Pennsylvania, Astronomical Series.—Volume V, Part I, of these publications has recently been issued. It consists of 1414 measures of 1033 double and multiple stars made by Dr. C. P. Olivier, director of the Flower Observatory, and by several of his assistants there. This represents a continuation of the line of work begun and carried quite far by the former director, Dr. Eric Doolittle. In the introduction the director describes certain improvements which have been made in the instruments in the course of this work. The results are given in groups according to the observer who made the measures, each group being preceded by a brief introduction by the individual observer.

Publications of the Allegheny Observatory.—Volume IX of these publications has recently been issued. It contains a list of 123 parallaxes, determined at the Allegheny Observatory and published previously, with references to the sources in which the details of their determination may be found. In addition to this list this volume contains the details of 290 parallaxes determined by several members of the staff of the Allegheny Observatory and published here for the first time. This new list of parallaxes is a continuation of the work initiated by Dr. F. Schlesinger when he was director of this observatory. It forms a valuable addition to the rapidly increasing literature on parallaxes, so useful in statistical studies of the organizations of the stellar system.

Dans le Champ Solaire, by Paul Couderc. (Gauthier-Villars and Company, Paris. Price 35 francs.)

An examination of this volume of 236 pages shows that the title can very well be expressed in the words, The Solar System. The presentation is divided into ten chapters, dealing with the history of solar studies, the earth, planets and satellites, general description of the sun, solar radiation, solar temperature and spectrum, interior condition of the sun, the sun among the stars, comets, and theories of cosmogony, in order. The various topics are thoroughly and intelligently considered and the illustrations are frequent and good especially the solar spectrum in colors. A reading of this work will give one a clear idea of the present status of our knowledge of the sun. As is indicated by the title, the work is in the French language.

The Elements of the Solar Motion, by Mathias Tibor. This is a pamphlet of seventy-five pages in which the author presents a discussion of the Solar Motion, basing it upon the data of the radial velocities of stars fainter than visual magnitude 4.5. The number of stars of the several spectral types used were: B, 186; A, 196; F, 104; G, 154; K, 140; M, 106; R, 18; a total of 904. A determination of right ascension, declination, and velocity was made for each class. These results were then combined into a final solution by the method of least squares. The final result is:

R.A. 269° 31′, Decl. 27° 2′, Velocity 19.47 km/sec.

These values agree well with earlier determinations by Campbell, Charlier, and Neubauer.